

# Evaluation of Filling in the Hospital Laboratory Critical Value Report: The Collaborative Role of Laboratory Personnel and Nurses

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**Abstract:** This paper focused on the evaluation of filling in the hospital laboratory critical value report. This research used mix methods, which is conducted in March and April 2019 at the "Z" hospital in the quality, laboratory and nursing units. Quantitative data were taken from secondary data (laboratory critical value reports in January and February 2019) and qualitative data sourced from in-depth interviews with 3 laboratory personnel and 3 nurses. The research findings showed that reports on the results of laboratory critical values cannot be completed, which is 29.5% (in January 2019) and 14.3% (in February 2019). The critical laboratory response time was not up to standard, which is 71.0% (in January 2019) and 66.7% (in February 2019). The achievement of the critical value reporting standard in January and February 2019 was 23.0%. The results of in-depth interviews showed that obstacles in reporting were SOP, negligence in filling out, communication with doctors and the role of nurse collaboration with laboratory staff. Collaboration between nurses and laboratory staff and revision of the SOP for reporting laboratory critical values are needed in filling out laboratory critical value reports.

## 1 INTRODUCTION

Laboratory services are part of hospital services. This service is important to sustain the diagnosis, treatment of diseases, and health recovery. Any errors in the follow-up of laboratory results will cause delayed treatment, medication errors, which have an impact on patient safety.

George D. Lundberg introduced the term "laboratory critical value" which was originally called "the value of panic", more than 45 years ago, defined as "pathophysiological conditions that can be life-threatening unless something is done immediately and corrective action is taken" (Lundberg in Doering, Plapp and Crawford, 2014). The critical value of the laboratory becomes very important in protecting patient safety. Reporting abnormal test results encourages early intervention in the course of the disease with the intention of stopping or hindering the process of the severity of a disease.

Reporting critical values is a mandatory practice in laboratory procedures, especially after the

inclusion of this activity in accreditation and clinical laboratory certification programs (Priva, Sciacovelli, Zaninotto, Laposata, Plebani, 2009).

The important role of laboratory critical values makes it one of the requirements for hospital accreditation both as an international and national requirement. In the case of an international laboratory accreditation program, timely reporting of critical values from test results and diagnostic procedures is the second target of accreditation undertaken to improve the effectiveness of communication among caregivers. As for some of the performance elements measured, including by whom and to whom the critical results are reported, the acceptable length of time between the availability and reporting of critical results and the timely evaluation of reporting critical results (The Joint Commission, 2019).

In Indonesia, laboratory services are part of the fifth standard of patient assessment, wherein standard 5.3.2 there are procedures for reporting critical laboratory results. These procedures include the determination of critical laboratory results and threshold critical values for each type of test for each

existing laboratory service, by whom and to whom critical laboratory results must be reported, including the time the results are delivered, recording and establishing monitoring methods that meet the provisions. The elements of the assessment are: there are regulations regarding critical laboratory results, reported by whom and to whom and the follow-up, recording critical laboratory results recorded in the patient's medical record, evidence of follow-up from the reporting, and evidence of the implementation of evaluation and follow-up to the entire process in order to meet the provisions and modified as needed (Komisi Akreditasi Rumah Sakit RI, 2017).

Observations at the "Z" hospital in February 2019 showed that there were several problems regarding the reporting of laboratory critical values, including the lack of confirmation of reporting critical values from nurses to physicians responsible for service to laboratory units, the incompleteness of filling laboratory critical value reporting books and critical value reporting responses. which is not in accordance with the established standards. Based on this, then this paper is focused on the evaluation of filling in the hospital laboratory critical value reports including regarding the collaborative role of laboratory personnel and nurses.

## 2 METHOD

This research used a mixed-method, conducted in March and April 2019 at the "Z" hospital, a type B hospital in West Java. The quantitative data in this study were secondary data sourced from the reporting book and the critical value worksheet of the laboratory in January and February 2019 in the quality unit. This data is used to assess the completeness of reporting. Quantitative data was also sourced from medical record files, which are used to view the response time of physicians in charge of services. To obtain accurate qualitative data, the triangulation of methods and sources is carried out. Method triangulation carried out by combining the method of in-depth interviews with document review. Triangulation of sources is by using different informants consisting of (1) head of laboratory installation service, (2) head of laboratory installation, (3) person in charge of laboratory, (4) head nurse of inpatient care, (5) nurse in charge of ICU and (6) nurse in charge of emergency installation. The univariate analysis used in this study.

## 3 RESULTS AND DISCUSSION

The laboratory critical value report at the "Z" Hospital in the first two months of 2019 totaled 65 reports: in January 2019 there were 44 and in February 2019 there were 21.

### 3.1 Completion of Reporting the Critical Value of "Z" Hospital

The completion of the critical value report can be seen from three components: (1) the time received from the results of the critical value, (2) the time of the critical value report to the nurse, and (3) the time of the critical value report from the nurse to the doctor in charge of the service.

For the percentage of time received from the results of critical values that were not filled either in January 2019 or in February 2019, it was almost the same: 4.5% and 5.0%. The percentage of time reported critical value to nurses who did not do the filling was higher in February 2019 (14.3%) than in January (9.1%). The percentage of non-filling of the critical time report from the nurse to the doctor in charge of service in the two months was the same: 100.0%. More complete can be seen in table 1 and table 2.

Table 1: Completion of reporting the critical value of "Z" hospital in January 2019 (N = 44).

Filling Components	No		Yes	
	n	%	n	%
Time received from the results of the critical value	2	4.5	42	95.5
Time report critical value to the nurse	4	9.1	40	90.9
Time report critical value from nurse to doctor in charge of service	44	100,0	-	-

Table 2: Completion of reporting the critical value of "Z" hospital in February 2019 (N = 21).

Filling Components	No		Yes	
	n	%	n	%
Time received from the results of the critical value	1	5.0	20	95.0
Time report critical value to the nurse	3	14.3	18	85.7
Time report critical value from nurse to doctor in charge of service	21	100.0	-	-

### 3.2 Report on the Critical Value of "Z" Hospital That Can Be Analyzed

So that the critical value report can be analyzed, the next step is to complete it through the medical record file. This is done to fill the nurse's report hours to the doctor in charge of the service.

The proportion of reports that ultimately could not be analyzed because the hours reported to the doctor could not be completed, more in January 2019 (as much as 29.5%) than in February 2019 (as much as 14.3%). This can be seen in table 3.

Table 3: Comparison of reports on the critical value of "Z" Hospital which can be analyzed in January and February 2019.

Month	Can't be analyzed		Can be analyzed		Total	
	n	%	n	%	N	%
January 2019	13	29.5	31	70.5	44	100.0
February 2019	3	14.3	18	85.7	21	100.0

### 3.3 Incomplete Medical Record File at "Z" Hospital

There were 4 reasons why the critical value reporting book cannot be completed for the reporting hours of the doctor in charge of the service: (1) the medical record file was incomplete, (2) the incompatibility of the medical record number in the reporting book, (3) the medical record number in the book the report was not complete, and (4) the medical record number was not written in the reporting book.

The majority of causes cannot be completed in the critical value reporting book for the report hours of the physician in charge of services due to incomplete medical record files, both in January 2019 (53.8%) and February 2019 (66.7%). More complete can be seen in table 4 and table 5.

Table 4: Incomplete medical record file at "Z" hospital in January 2019 (N = 13).

Reasons	n	%
The medical record file was incomplete	7	53.8
The incompatibility of the medical record number in the reporting book	2	15.4
The medical record number in the book the report was not complete	1	7.7
The medical record number was not written in the reporting book	3	23.1
Total	13	100.0

Table 5: Incomplete medical record file at "Z" hospital in February 2019 (N = 3).

Reasons	n	%
The medical record file was incomplete	2	66.7
The medical record number was not written in the reporting book	1	33.3
Total	3	100.0

### 3.4 Response Time Reports on Laboratory Critical Values at "Z" Hospital

After the report can be analyzed through the medical record file, an evaluation of the response time of the laboratory's critical values will be assessed. The "Z" hospital sets the standard that a critical value must be reported to the person in charge of the service in order to receive further treatment instructions in less than/equal to 30 minutes. "Z" hospital has set a target of achieving 100% of the response time reporting critical values.

In general, the response time from the laboratory critical value report did not reach the standard (more than 30 minutes), both in January 2019 (71.0%) and in February 2019 (66.7%). This can be seen in table 6.

Table 6: Comparison of achievement of targets in the response time of reporting laboratory critical values at "Z" hospital in January and February 2019.

Month	Not achieved (> 30 mnt)		Achieved (≤ 30 mnt)		Total	
	n	%	n	%	N	%
January 2019	22	71.0	9	29.0	31	100.0
February 2019	12	66.7	6	33.3	18	100.0

### 3.5 Achievement of Standards in Reporting Laboratory Critical Values in "Z" Hospital

Based on the exposure of previous quantitative data, it can be stated that the achievement of the critical value reporting standard in January and February 2019 was 23.0%. This can be seen in Figure 1.

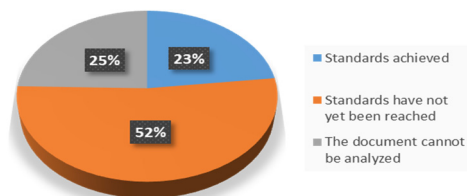


Figure 1: The achievement of the critical value reporting standard in January and February 2019.

The results of this study are similar to the research conducted by Adiputra (2014) in Bali, where the critical value reporting rate in Sanglah Hospital Denpasar was 30.01%.

### 3.6 Reporting Process

#### 3.6.1 Reporting Steps

The person in charge of the laboratory and the head of the laboratory service explained about the critical value report steps: the results come out, several stages of analysis are carried out, the laboratory officer forwards the report to the nurse, then the nurse reports to the doctor in charge of the service.

*"...first seen pre-analytic, analytic and post-analytic, it means whether we have correct sampling, if it is correct we report it to the person in charge of our clinical laboratory or pathology doctor, for example, the 3rd or 4th floor of a child, we report to the nurse, later it will be reported, confirmed continue to report back hours recorded in the reporting book, after 15 minutes we followed up what patients were taken or what drugs were given, if the outpatients he enrolled to our doctor, we immediately inform the nurse or doctor if the outside patient we report later to the emergency room doctor later the emergency room doctor will take action..."* (person in charge of the laboratory)

*"...critical values are immediately reported to me, then I agree, then the laboratory staff will report to the nurse, and the nurse must report to the responsible doctor..."* (head of laboratory services)

The results of this interview are in accordance with hospital accreditation rules set by the Indonesian Hospital Accreditation Commission (Komisi Akreditasi Rumah Sakit RI, 2017) which is the hospital sets regulations to carry out laboratory quality control procedures, are evaluated and recorded as documents. The quality control program includes the Pre-analytic, Analytic and Post-analytic stages which include validation of tests used for tests of accuracy, precision, results of range of values.

#### 3.6.2 Reporting Time

The person in charge of the laboratory and the head of the laboratory installation stated that the results of the critical values are consulted to the clinical pathologist and are reported immediately.

*"...It must be reported immediately, yes it must be checked by PJ, the pre-analytical sampling is correct or not, if it is correct, we report immediately but must first report to the clinical pathologist, the principal*

*should be reported immediately..."* (laboratory person in charge)

*"... After knowing that there is a critical value, we have to see what the pre-analytic looks like, we will find out first how it's taken. If everything is correct and there is no doubt, we consult with the clinical pathologist and report it directly to the relevant unit..."* (head of the laboratory installation).

This is consistent with the definition of the critical test stated by Campbell et al. (2015) as "tests that require direct communication regardless of whether the results are normal, significantly abnormal or critical".

#### 3.6.3 Initial Report from the Laboratory

The person in charge of the laboratory stated that in the Standard Operating Procedures (SOP) the reporting is done by the person in charge, but if the person in charge is busy can be reported by the laboratory analyst after reporting to the person in charge first.

*"...Reporting is done by all laboratory analysts if the person in charge is busy but still reports to the person in charge first. So, the reporter does not have to be in charge of the laboratory. In the SOP it should be noted that the person in charge should be, but in real conditions, it cannot be done because the person in charge is busy..."* (Laboratory person in charge).

#### 3.6.4 Human Resources in the Laboratory

The person in charge of the laboratory stated that human resources in carrying out work in the laboratory coupled with critical monitoring and reporting of critical value were still lacking.

*"...Human resources are lacking, for example, inpatients we do sampling only 1 person for 3 floors of inpatients. This is lacking. Even though we are required to process this critical value quickly. If the service is to be good, there must be a lot of human resources..."* (laboratory person in charge).

### 3.7 Reporting Constraints

#### 3.7.1 SOP of Laboratory Critical Value

According to the laboratory personnel, the SOP for reporting critical values has been socialized.

*"...Already, through hand-over shift..."* (the person in charge of the laboratory).

*"...Already for us, for example, there is a critical value in hematology he must immediately understand..."* (head of laboratory installation services).

"...SPO for all nursing must know and for the laboratory, every new employee will definitely be socialized..." (head of the laboratory installation).

Otherwise, according to nurses, in general, they have never read a critical value SOP, those who have read only once. There were also those who say the SOP socialization is lacking.

"...Never read, SOP has never been in an emergency department..." (nurse in charge of emergency installation)

"...I knew I've read it once, it's just lacking in socialization..." (the head nurse of inpatient care).

"...I have never read SOP. The SOP has been socialized and I have ever heard..." (nurse in charge of ICU).

### 3.7.2 Negligence

According to the laboratory personnel, negligence is one of the reasons for no report hours in the laboratory critical value reporting book.

"...Forgetting, in a hurry or negligent because of doing other things..." (the person in charge of the laboratory).

"...That's because the officers who might be negligent..." (head of the laboratory installation).

### 3.7.3 Communication with Doctor in Charge of Service

According to laboratory personnel, monitoring of the hours reported to the doctor in charge of the service is carried out by nurses. They cannot monitor and carry out a follow-up.

"...We cannot monitor the communication from the nurse to the doctor in charge. Whether the doctor receives the results immediately or the next day, we don't know. So the rules regarding critical values can only be monitored and applied in laboratory units..." (head of laboratory installation services).

"... For the time reported to the doctor the nurse should have informed us because we could not afford to have to follow up there..." (head of the laboratory installation).

The nurses stated that the obstacle in communicating with the doctor in charge as they were difficult to contact.

"...The doctor can't be contacted..." (nurse in charge of emergency installation).

"... Sometimes the doctor is hard to contact, sometimes the doctor is in a meeting, many of the doctors are from other hospitals as well, so we report to the doctor's office first so that we can respond immediately ..." (the head nurse of inpatient care).

"... Usually, the doctor can be contacted except at night, but we will still contact if we cannot the next morning, but still report the doctor on duty to get instructions..." (nurse in charge of ICU).

The communication problems experienced by the "Z" hospital are similar to those experienced at Sanglah hospital in Bali, where many doctors in charge of services cannot be contacted (Adiputra, 2014).

### 3.7.4 Nurse Communication with Laboratory Personnel

The nurses stated that the confirmation to the laboratory staff was only done in reading the results of the laboratory. They did not confirm the results of the reporting to the doctor in charge of the service. There was also a statement that implies that the laboratory should follow up with the nurses indirectly. In addition, it may be because nurses forgot to report to the laboratory staff.

"...No, we won't tell the lab anymore, at most we just confirm it, is true about the results of laboratory, after that we reported the doctor or the emergency room doctor, that's it..." (nurse in charge of emergency installation).

"...Maybe if the data is indeed needed by the lab, they have never followed up to us about what we get from the doctor..." (the head nurse of inpatient care).

"...I've heard, but nurses often forget to report back to the laboratory staff..." (nurse in charge of ICU).

## 4 CONCLUSIONS

The completion of laboratory critical value reports has not optimal yet. These are due to the incompleteness of filling out the report book, the results of laboratory critical values that cannot be completed, the response time of critical values that do not meet standards, laboratory staff are negligent in filling out report hours, nurses who do not know or who have never read the SOP, nurses who do not know not knowing that the results of instructions from the doctor in charge must be reported back to the laboratory unit, and the doctor in charge who is difficult or cannot be contacted.

SOP for reporting critical laboratory values need to be socialized for nurses. A revision of the SOP for reporting laboratory critical values is needed: details of who should be followed up to get instructions from the physician in charge of service and adding a flow

of critical value reporting. It also requires the addition of a critical value validation time column. Therefore, the collaboration between nurses and laboratory staff is needed in filling out laboratory critical value reports.

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