



Original Research Article

Impact of Improved Critical Lab Results Documentation on Patients' Safety in ICU, A Prospective Study

Waleed Al-etreby, Abdulrahman Al-Harthy, Shabir Karim, Mahmoud Al-jabry, Lori Anne Dumlao, Taisy Joy Stephen, Ma Teresita Barraquias, Ahmed Dudin, Eman Abdullah

Critical Care Department, King Saud Medical City, Riyadh, Saudi Arabia.

Corresponding Author: Waleed Al-etreby

Received: 03/07/2015

Revised: 04/08/2015

Accepted: 04/08/2015

ABSTRACT

Patient safety is becoming a focus of healthcare authorities and organizations, as they impact outcome of patients and healthcare effectiveness and efficiency, as evident from the emphasis on international patient safety goals by accrediting organizations such as The Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The Intensive Care Unit (ICU) at King Saud Medical City has a policy of documenting critical lab results (CLR) and responding to it within 15 minutes.

The aim of this study was to evaluate and improve the compliance of the CLR reporting policy, and to study the effect of compliance on patient safety.

Results: During January 2014 the compliance rate was 30%, and improved gradually as a result of an awareness campaign and the introduction of a daily monitoring process through a log book, by the end of 2014, the compliance rate was 98%. Correlation of the improved compliance with cardiac arrests due to abnormal lab findings by regression analysis showed a strong negative correlation ($r = -0.642$), and a statistically significant p value of 0.024

Conclusion: Proper documentation and timely response to critical lab results has a strong negative correlation to cardiac arrests due to abnormal lab findings, and has a positive impact on patients' safety.

Key words: critical care, critical lab results, patient safety, communication, compliance.

INTRODUCTION

Patient safety is increasingly becoming a focus of healthcare organizations as well as authorities. [1] The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) acknowledges the importance of patient safety by dedicating a large number of their accreditation standards and measurable elements to patient safety under section II (Patient-Centered Standards) of their

hospitals accreditation manual, specifically International Patient Safety Goals (IPSG). [2]

One of these IPSGs is to improve communication among caregivers, by improving reporting of critical lab results (CLR), [2] as they may constitute a potential life threatening condition, that require immediate intervention, and they also reflect not only on patient safety, but on clinical effectiveness and operational efficiency. [3]

King Saud Medical City (KSMC) is the largest MOH hospital in Saudi Arabia,

and its Intensive Care Unit (ICU) is also the largest in the region with 105 beds capacity. KSMC being a JCI accredited hospital fosters a culture of patient safety, and particularly in the ICU we focus on patient safety as a pillar of our high quality service rendered to our patients. Documentation of critical lab results, as an issue of patient safety, is governed by a policy detailing the process of documentation, data to be documented, as well as timing.

Objectives:

Primary: to evaluate the compliance with critical lab reporting policy, and act on any chance of improvement identified through a Performance Improvement Project (PIP).

Secondary: to evaluate the effect of improved CLR reporting on patient safety.

MATERIALS AND METHODS

During January 2014, all critical lab results reported by our central lab were evaluated for appropriateness of documentation in the patients' file. Appropriate documentation was defined (according to our policy) as containing time and date, name of recipient, value of critical result, person to whom it was relayed, and response or action taken within not more than 15 minutes. Evaluation of appropriateness of documentation was ALL or NONE based, if any element was missing the whole process was considered inappropriate.

Planned intervention: If an opportunity of improvement was identified, an educational campaign was to be launched, along with implementation of new mechanisms to ensure proper documentation.

Statistical analysis: Properly documented CLR were presented as percentage, and compared between quarters of the year by Fisher's Exact Test of proportions, and graphically displayed as line graph.

For the secondary objective, we correlated the percentage of properly documented CLR

to the number of Cardio Pulmonary Resuscitation (CPR) that are related to or associated with abnormal lab results (namely: hemoglobin, creatinine, blood sugar, or electrolyte levels) as defined by our mortality and morbidity committee. Correlation was done by regression analysis, and Pearson correlation coefficient (r) reported.

Statistical analysis and graphs were generated by Minitab® 17 for windows. P values above 0.05 were considered statistically significant.

RESULTS

At the end of January 2014 we reviewed all the CLR reported to our ICU for proper documentation, and found only 33 CLR out of 109 (30%) properly documented. This definitely represented a vast area for improvement to us, so a Performance Improvement Project (PIP) was started (using FOCUS-PDCA method) to increase the percentage over the following months, with the aim of 100% proper documentation. Our PIP consisted of:

- An educational campaign to all of our staff about CLR, that consisted of a series of weekly lectures, group discussions, and case presentations.
- Reminders as posters and on billboards in the ICU.
- A checklist was deployed to monitor CLR reported to us around the clock, that is reviewed daily.
- Addressing issues of non compliance in our compliance committee, and one – on – one talks by the quality team.

The campaign lasted for 3 months, while we continued to monitor compliance for the rest of the year 2014.

Monthly percentages of properly documented CLR out of all reported are represented in table 1 and figure 1.

Table 1: properly documented CLR out of all reported, 2014.

Month	CLR reported (n)	CLR properly documented (n)	Percentage (%)
January	109	33	30
February	126	53	42
March	100	50	50
April	110	66	60
May	105	77	73
June	114	96	84
July	123	105	85
August	135	123	91
September	134	122	91
October	98	85	87
November	102	95	93
December	112	110	98

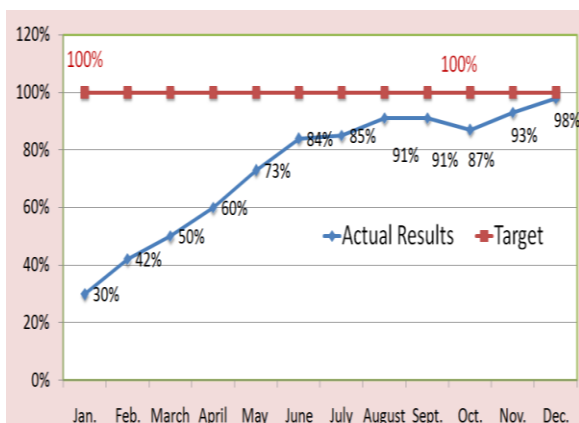


Figure 1: percent of documented CLR out of all reported, 2014

The average of properly documented CLR for the first quarter was 40.6%, for the second quarter 72.6%, third quarter 89.3%, and fourth quarter 92.9%, a highly significant statistical difference was found ($p < 0.0001$) when the average of the first quarter was compared to the second, and when the second was compared to the third, whereas comparison of the third quarter to the fourth yielded an insignificant p value of 0.113. Naturally, comparison of the first quarter's mean to the fourth, resulted in a highly significant p value of 0.00 (table 2)

Table 2: Comparison of Quarterly average of properly documented CLR

Comparison	p value
Q1 to Q2	$p < 0.0001$
Q2 to Q3	$p < 0.0001$
Q3 to Q4	$p = 0.113$
Q1 to Q4	$p = 0.00$

Regression analysis of the percentage of properly documented CLR and the number of CPRs related to abnormal lab values, showed a strong negative correlation ($r = -0.642$) and a statistically significant p value of 0.024 (figure 2).

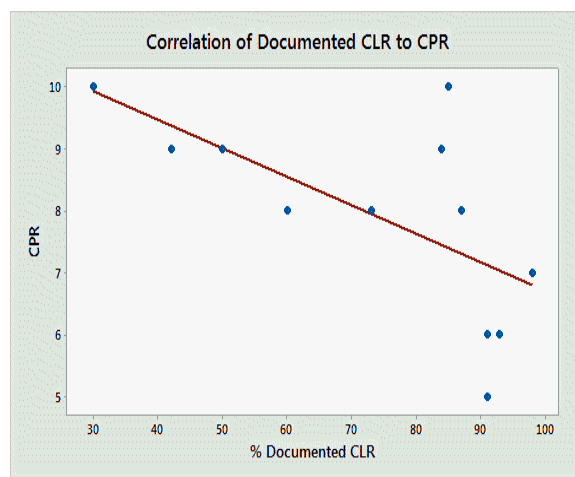


Figure 2: Correlation of Documented CLR to CPR

DISCUSSION

In their landmark report “To Err Is Human” published in 1999, [4] The Institute of Medicine identifies failure to act on results of testing as a type of error in the diagnostic process. In our institute this type of error was prevalent at the beginning of 2014, with only 30% of CLR adequately documented, that percentage was higher than findings from other studies, such as the study by Roy et.al [5] where physicians were unaware of 37.1% of test results that were actionable. However, with the implementation of a performance improvement project, that percentage continued to improve over time, till it reached 98% by December 2014. Our goal is to reach a 100% documentation of CLR, which is achievable with the continuation of educational efforts, and awareness campaigns, as such interventions were shown to produce measurable improvement, like in our study, as well as in other fields. [6]

The significant improvement noted in our study in proper documentation (which includes by definition a response within not more than 15 minutes), was much better than that reported by Gilad et al, [7] where the median time for response was 1 hour.

Few studies evaluated the impact of CLR reporting on patients' outcome and safety, and those who did, evaluated the impact from the perspective of harm, including minor and major. Kachalia et.al [8] reported 13 out of 79 (16.5%) claims by patients treated in emergency department identified the breakdown to have occurred at the step of test results transmitted to and received by the provider and resulted in harm. Many others reported that this breakdown of communication was a common problem. [9-11]

In our study, there was a strong negative correlation between the number of CPRs related to abnormal lab results and percentage of proper documentation. It is well known that correlation does not mean causation, and this is not our conclusion, but these results surely indicate that proper documentation of CLR, have a significant impact on patient safety, that can be explained by the process itself, where an action to correct the critical result is required within 15 minutes, as a result properly documenting the reported result, becomes the prompt for action to correct it.

CONCLUSIONS

- Failure to report and react to critical lab results is a common problem that threatens patients' safety.
- Hospitals should have a clear process to report CLR that includes time frames of reporting, method of reporting, responsible receiver, ranges of values to be reported as critical, proper documentation on the receiving end, fail-safe plan in case of communication

breakdown, and a supporting policy for that process. [12]

- Proper documentation of CLR and timely intervention has a strong negative correlation with patients' harm, and significantly improves safety.
- Continuous education and awareness can result in the desired outcome of performance improvement.

REFERENCES

1. Dighe, A., Rao, A., Coakle, A., & Lewandrowski, K. (2006). Analysis of Laboratory Critical Value Reporting at a Large Academic Medical Center. *Am J ClinPathol*, (158), 758-764.
2. Joint Commission International. (2014). *Joint Commission International Accreditation Standards for Hospitals* (5th ed.). Joint Commission Resources.
3. Kuperman GJ, Boyle D, Jha A, & Et al. (1998). How promptly are inpatients treated for critical laboratory results? *J Am Med Inform Assoc*, 5, 112-119.
4. Kohn LT, Corrigan JM, Donaldson MS (Institute of Medicine). (2000). *To err is human: building a safer health system*. Washington, DC: National Academy Press.
5. Roy CL, Poon EG, Karson AS, et al. (2005). Improving patient care. Patient safety concerns arising from test results that return after hospital discharge. *Ann Intern Med*, (143), 121e8.
6. A. Al-Harthy, A.F. Mady, M. A. Rana, W. Al-Etreby, T. Asaad, W. Al-zayer, & O.E. Ramadan. (2015). Complete Audit Cycle: CLABSI Bundle Compliance in ICU. *International Journal of Health Sciences & Research*, 5(2).
7. Gilad J. Kuperman, Jonathan M. Teich, Milenko J. Tanasijevic, Nell Ma'luf, Eve Rittenberg, Ashish Jha, Julie Fiskio, James Winkelman, David W. Bates. (1999). Improving Response to Critical Laboratory Results with Automation: Results of a Randomized Controlled Trial. *JAMIA*. (6)512-522.

8. Kachalia A, Gandhi TK, Puopolo AL, et al. (2007). Missed and delayed diagnoses in the emergency department: a study of closed malpractice claims from 4 liability insurers. *Ann Intern Med.*(49)196e205.
9. Tate KE, Gardner RM. (1993). Computers, quality, and the clinical laboratory: a look at critical value reporting. *ProcAnnuSympComputAppl MedCare.* 193e7.
10. Kilpatrick ES, Holding S. (2001). Use of computer terminals on wards to access emergency test results: a retrospective audit. *BMJ* (322)1101e3.
11. Choksi V, Marn C, Bell Y, et al. (2006). Efficiency of a semiautomated coding and review process for notification of critical findings in diagnostic imaging. *Am J Roentgenol.* (186)933e6.
12. Doris Hanna, Paula Griswold, Lucian L. Leape, David W. Bates.(2005). Communicating Critical Test Results: Safe Practice Recommendations. *Joint commission Journal on Quality and Patient Safety.* (31), 2.

How to cite this article: Al-etreby W, Al-Harthy A, Karim S et al. Impact of improved critical lab results documentation on patients' safety in ICU, a prospective study. *Int J Health Sci Res.* 2015; 5(9):67-71.

International Journal of Health Sciences & Research (IJHSR)

Publish your work in this journal

The International Journal of Health Sciences & Research is a multidisciplinary indexed open access double-blind peer-reviewed international journal that publishes original research articles from all areas of health sciences and allied branches. This monthly journal is characterised by rapid publication of reviews, original research and case reports across all the fields of health sciences. The details of journal are available on its official website (www.ijhsr.org).

Submit your manuscript by email: editor.ijhsr@gmail.com OR editor.ijhsr@yahoo.com