



Determination of Quality outcome indicators in National Quality Assurance Standards (NQAS) accredited Hematology and Clinical Pathological laboratory

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ABSTRACT

Background: Laboratory plays a vital role in disease control and prevention by providing timely data or information for patient management and disease surveillance. Quality in laboratory has huge impact on diagnosis and patient management as about 80% of all diagnosis is made on the basis of laboratory tests.

Methods: The study was conducted in Central Diagnostic Laboratories of GMERS Medical College, Junagadh which is NQAS (National Quality Assurance Standards). The hospital uses internet and data is retrieved by the systems department. The study was conducted from January 2015 to December 2018. A total of 2,13,476 samples were received in the hematology and clinical pathology section. Different quality outcome indicators of hematology and clinical pathology laboratory were studied.

Result: All Quality parameters were consistently improved from 2015 to 2018 due to new instrumentation, IQC, EQC, timely instrument maintenance, laboratory information system (LIS), telephonic communications and monthly-yearly quality improvement meetings. Some important indicators like TAT, critical alert were not reach up to the target value but due continuous improvement plane we soon reach target level.

Conclusion: The concept of quality indicators has revolutionized the field of laboratory medicine. These indicators are of most importance in the comparison of individual laboratory performance with the aim of improving laboratory services and quality.

Keywords: National Quality Assurance Standards, Quality Outcome Indicator, Turn Around Time

Introduction

Laboratory plays a vital role in disease control and prevention by providing timely data or information for patient management and disease surveillance. [1] Quality in laboratory has huge impact on diagnosis and patient management as about 80% of all diagnosis is made on the basis of laboratory tests. [2] [3] The increasingly dominant role of laboratory medicine in clinical decision making and the pressure on cost containment have led to a more careful evaluation of the effectiveness of, and improvement in, clinical outcomes. Because laboratory tests play an extremely important role in diagnosing, monitoring, and evaluating patient outcomes, evidence-based evaluation of laboratory performances is crucial to ensuring that patients receive safe, efficient, and effective care. Measurement of the quality is critical to improvement of processes and outcomes. This area of concern has four standard measures for quality- Productivity, Efficiency, Clinical Care and Service quality in terms of measurable indicators. [4]

Materials and Methods

The study was conducted in Central Diagnostic Laboratories of GMERS Medical College, Junagadh which is NQAS

(National Quality Assurance Standards). The hospital uses internet and data is retrieved by the systems department. The study was conducted from January 2015 to December 2018. A total of 2,13,476 samples were received in the hematology and clinical pathology section. Different quality outcome indicators of hematology and clinical pathology laboratory were studied. [5] (Table 1) Following instruments were used in our laboratory for sample processing: Horiba Pentra XLR 5 part fully automated hematology analyzer, Arkray AE 4020 urine analyzer and ARX-Clot semi-automated coagulation analyzer. For Internal Quality Control (IQC), three level commercial quality controls were used for hematology tests and two level quality controls were used for both coagulation tests and urine tests. For External Quality Control (EQA) in hematology we received samples from All India Institute of Medical Sciences, New Delhi under ISHTM – AIIMS EQAP PROGRAMME and for coagulation studies, we received samples from Christian Medical College, Vellore under ISHBT- CMC EQAS. Samples were received quarterly in a year.

Result:

Over a period of 4 years, a total of 2,13,476 samples were received in our hematology and clinical pathology



laboratory. The below quality indicators were studied and documented every month. (Table-2)

Discussion

All Quality parameters were consistently improved from 2015 to 2018 due to new instrumentation, IQC, EQC, timely instrument maintenance, laboratory information system (LIS), telephonic communications and monthly-yearly quality improvement meetings. Some important

indicators like TAT, critical alert were not reach up to the target value but due continuous improvement plane we soon reach target level. One of the most visible and talked about areas of laboratory service is how fast a test result is returned to a caregiver. [6] Our study reveals TAT of 6.0 % while Steindel SJ, Novis DA (1999) [6] reported it to be 10.4%. The potential for technological solutions to improve the process of critical value reporting is evident in numerous reports. [7, 8] The use of information technology

Table 1: Quality outcome indicators in Hematology and Clinical Pathological laboratory.

Type	Sr. No	Quality Indicator	Frequency	source of data	Significance
Productivity	1	Number of Blood smear examined done per 1000 population	Monthly	Lab Register, systems department	Indicator to measure Utilization of blood smear services of Laboratory
	2	Number of HB test done per 1000 population	Monthly	Lab Register, systems department	Indicator to measure Utilization of HB services of Laboratory
	3	Lab test done per patient to OPD	Monthly	Lab Register, systems department	Indicator to measure Utilization of laboratory services by OPD patients
	4	Lab test done per patients IPD	Monthly	Lab Register, systems department	Indicator to measure Utilization of laboratory services by indoor patients
	5	Proportion of lab test done at night	Monthly	Lab Register, systems department	Indicator to measure Utilization of laboratory services during night time
	6	Proportion of lab test done for BPL patients	Monthly	Lab Register, systems department	Indicator to measure Utilization of laboratory services by BPL patients
Efficiency	7	Number of test matched in validation by EQAP- AIIMS, Delhi	Monthly	EQAP Assessment sheet	Indicator to measure clinical efficiency of laboratory
	8	Z Score for Haematology (or Equivalent) in EQAP- AIIMS, Delhi	Monthly	EQAP Assessment sheet	Indicator to measure clinical efficiency of Haematology lab
	9	Down time critical equipment	Monthly	Equipment Maintenance Register	Indicator for measuring efficiency of critical equipment
	10	% Investigations out of Turn around time for routine lab investigations	Monthly	Lab Register, systems department	Timely reporting of laboratory tests improve patient care efficiency, effectiveness, and satisfaction
	11	% Investigations out of Turn around time for emergency lab investigations	Monthly	Lab Register, systems department	Timely reporting of laboratory tests improve patient care efficiency, effectiveness, and satisfaction
Clinical care and safety	12	% of Critical values reported within one hour	Monthly	Lab Register, systems department	Critical values reporting is considered an important laboratory process because it can impact clinical decision making, patient safety, and operational efficiency.
	13	Number of adverse events per thousand patients	Monthly	Adverse event reporting register	Indicator for measuring adverse events

Type	Sr. No	Quality Indicator	Frequency	source of data	Significance
Clinical care and safety	14	Report correlation rate	Monthly	Audit and feedback record register	Indicator to measure quality of lab reporting
	15	Proportion of false positive/false negative for Malaria pf/pv antigen test	Monthly	Lab Register	Indicator to measure quality of rapid diagnostic kit
Service Quality Indicator	16	Waiting time at sample collection area	Monthly	Time motion study	Indicator for measuring service Quality during routine working time
	17	Number of stock out incidences of Reagents	Monthly	Stock Register	Indicator for measure availability of reagents

Table 2: Last three years performance and target values of Quality outcome indicators in Hematology and Clinical Pathological laboratory

Type	Sr. No	Quality Indicator	Year 2015	Year 2016	Year 2017	Year 2018	Target
Productivity	1	Number of Blood smear examined done per 1000 population	0.5	1.1	1.9	2.5	>1
	2	Number of HB test done per 1000 population	0.9	1.5	2.4	3.2	>2
	3	Lab test done per patient to OPD	0.2	0.4	1.2	1.4	>0.5
	4	Lab test done per patients IPD	0.6	0.65	0.8	0.85	>0.5
	5	Proportion of lab test done at night	0.06	0.10	0.12	0.23	>0.2
	6	Proportion of lab test done for BPL patients	0.5	0.63	0.8	1.1	-----
Efficiency	7	Number of test matched in validation by EQAP- AIIMS, Delhi	100%	100%	100%	100%	100%
	8	Z Score for Haematology (or Equivalent) in EQAP- AIIMS, Delhi	2.8	1.86	1.2	0.86	<2
	9	Down time critical equipment	5days	3days	3 days	36 hour	<48 hours
	10	% Investigations out of Turn around time for routine lab investigations	9.1%	6.1%	5.8%	6.0%	5%
	11	% Investigations out of Turn around time (TAT) for emergency lab investigations	5.8%	3%	3%	2.2%	5%
Clinical care and safety	12	% of Critical values reported within one hour	95%	95%	97%	96%	100%
	13	Number of adverse events per thousand patients	2	1	0	1	<1
	14	Report correlation rate	92%	95%	97%	97%	100%
	15	Proportion of false positive/false negative for Malaria pf/pv antigen test	0.002	0.002	0.002	0.002	<0.005
Service Quality Indicator	16	Waiting time at sample collection area	15min	13min	10min	10min	<15 min
	17	Number of stock out incidences of Reagents	5	5	3	0	0

to automatically communicate with the responsible provider has been demonstrated to reduce the critical value reporting time in controlled settings. For implementation of automated critical value reporting, interfaces from the LIS to technologies that facilitate bidirectional communication (such as e-mail or 2 - way pagers) need to be developed. By this way we will improve our critical value reporting time as close as 100%. Up till now very limited studies over NQAS parameters so detail comparative study of other quality indicators not possible.

Conclusion

The concept of quality indicators has revolutionized the field of laboratory medicine. These indicators are of most importance in the comparison of individual laboratory performance with the aim of improving laboratory services and quality. It is now possible to compare our laboratory functions with others by simply evaluating the prevalence of the various indicators. It should be ensured that the quality of work is not compromised due to the quantity. We should strive to reach these benchmarks to provide the best services to society.

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Financial or other Competing Interests: None.