Precision in Hematology Laboratory Practices through Quality Indicator Adherence

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Original Research Article

ABSTRACT

Quality indicators are capacity paraphernalia for streamers that are used as guides to scrutinize, calculate and improve the quality of patient care, clinical support services and organizational function that affect patient outcomes. This observational study was done at NKP SIMS, LMH, Nagpur from January 2014 to December 2017. The study was conducted at Hematology and Clinical Pathology section of Central Pathology Laboratory by maintaining TAT (Turn Around Time) up to 5% permissible limit with objective to design and review quality indicators from time to time in an effort to improve the performance of the laboratory. Nine quality indicators were studied. The target for each quality indicator was set according to previous year's performance. Total 9, 63,583 samples were received. Quality indicators like internal quality control, external quality assessment, critical alerts, turnaround time, specimen collection & storage, completeness of requisition form, specimen rejection and avoidance of transcriptional error in reporting from entry register to computer were studied and continuous quality improvement was noted. It was thereafter inferred that the quality improvement plan in hematology and clinical pathology is an effective tool.

KEY WORDS: central pathology laboratory, hematology, quality indicators

INTRODUCTION:

Quality Indicators assess the performance of process, quality of services, potential quality concerns, supplementary studies and related investigations for track changes over the time. Indicators are developed as per their measurability, achievability, interpretability, action ability, engage ability and balance ability[1,2]. Laboratory testing and services have an important role in provision of health care. Assessing the quality of laboratory services using quality indicators or performance measures requires a systematic, transparent and consistent approach in collecting and analyzing the data[3,4]. A complete approach addresses all stages of the laboratory's total testing process with a focus on the areas considered most likely to have important consequences on patient care and health outcomes[5,6,7,8]. Quality indicator data should be collected over a time period to identify, correct and continuously monitor problems improving performance by identifying with implementing effective interventions[9]. The laboratory quality indicators identified are grouped according to the stage of the total laboratory testing process. [9] The indicators along with the related Institute of Medicine (IOM) health care domains, phase of lab work flow and performance target are listed herein (Table 1). The indicators identified span of stages for the total laboratory testing process. However, these do not provide comprehensive coverage. The accepted indicators include assessment by their result interpretation, consequent action, analysis, patient identification and specimen collection. However, few indicators may result in insufficient monitoring of all stages during testing process. The commonest indicators identified include IOM health care domains, safety, timeliness, effectiveness, and efficiency. Indicators may be associated with patient centeredness, but none of these indicators may be associated with justice, having relatively small in number and their lack of widespread use in practice as they are use full and covered at various stages of testing process and, IOM domains [8].

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MATERIAL AND METHODS:

An observational study was conducted in in Hematology section, Central Pathology Laboratory. NKP Salve Institute of Medical Sciences and

Research Centre, Nagpur, India during Jan 2014 - Dec 2017 after obtaining clearance from the Institutional Ethics Committee. Results were studied in accordance with the permissible limit for each quality indicator as an effective tool for ensuring continuous quality improvement by the use of IQLM (Internal Quality Laboratory Management) indicators based on Baldridge award criteria 1996 by use of Bob Galvin cycle (i.e. Define-MEASURE-analyze-improve-Control) consistent cycling. Study target was to maintain TAT (Turn Around Time) according to feasibility of assets with permissible limits of 5 %. Ten percent samples were randomly picked up for quality indicators to evaluate ratio of performance. The target for each quality indicator was set according to previous year's performance.Table:2: A total of 9, 63,583 samples were received in the hematology and clinical pathology section. Quality indicators were evaluated with respect to their performance target, phase of lab work flow, assessment tools and IOM domain (Table 1). Like internal quality control (IQC), external quality assessment (EQA), critical alerts (CA), turnaround time (TAT), specimen collection & storage, completeness of requisition form, specimen rejection and avoidance of transcriptional error in reporting from log book to computer were studied. The instruments used in laboratory for sample processing were: ABX 60 automated cell counter, shift to highly upgraded model ADVIA 2120i for haematology. Automated coagulation analyzer trinity replaced by Upgraded model Erba Mannheim ECL 412 coagulometer.

The IQC is monitored by three level quality controls in hematology and two level quality controls were used for both coagulation tests and urine tests. The EQA in hematology were monitored and assessed by regular participation with All India Institute of Medical Sciences, New Delhi under ISHTM – AIIMS EQAP PROGRAMME. Critical alerts were intimated to the clinicians with documentation. TAT of tests was calculated for samples from each of the Outdoor Patient Department and Indoor Patient Department and their reasons were documented.

RESULTS:

An evaluative assessment of 9, 63,583 samples was conducted, deposited over three years, through quality indicators in line with respective assessment tools, IOM Domain, Phase of lab work flow & performance target (Table: 1). The results were studied and documented on monthly basis. 1-IQC results were consistently accurate (Table: 2 & Fig: 1). EQA results illustrated minor discrepancy in year 2014. Hence, root cause analysis for the same was performed followed by corrective measures like use of upgraded model of 5 Part Cell counter ADVIA 2120i & Erba Mannheim ECL 412 automated coagulometer.2- In case of CRITICAL ALERT, the target of 100% has not been achieved due to many reasons like failure to communicate results to clinicians, same results on repeat samples, network issues and problems during telephonic communications.3- TAT has shown major improvement like request completeness and specimen collection. Rejection Criteria are maximum in TAT. The reasons for delay (TAT) were identified and measures taken to correct the problems. For pre-analytical errors (like specimen collection & storage, completeness of requisition forms and specimen rejection), CME and training for residents, technicians, phlebotomists and clinicians were organized. Post CME and training, it major improvements in laboratory associated staffs as well as assessed indicators were noted being 100% (within the permissible limit as targeted) in TAT. There is felt need of LIS (Lab Information System), HMIS (Hospital Management Information System) and pneumoshoot to shorten the TAT.4-

Transcription Error was evaluated through advisory Services. Results were being dispatched manually & through inter-phase server system. Improvements were incorporated in this service by using HIMS and LIS implementation. These corrective measures had major role in achieving targets for improvement in identified indicators and TAT. 5. The accuracy of procedure and results inter-phase server system was replaced by LIS (Window based) and HMIS for quality enhancement. Implementing pneumoshoot shall further shorten the TAT.

DISCUSSION:

The results for IQC were consistently accurate. EQA results showed a minor discrepancy in 2014 and root causes were accordingly rectified by up-gradation of instruments and manpower capacity building to achieve accuracy of point of care testing. Further analysis was performed, causes identified and corrective measures taken to ensure that mistakes were not repeated and results were accurate. In case of critical alert, the target of 100% has not been achieved due to multiple reasons like failure to communication results to clinicians, same results on repeat samples

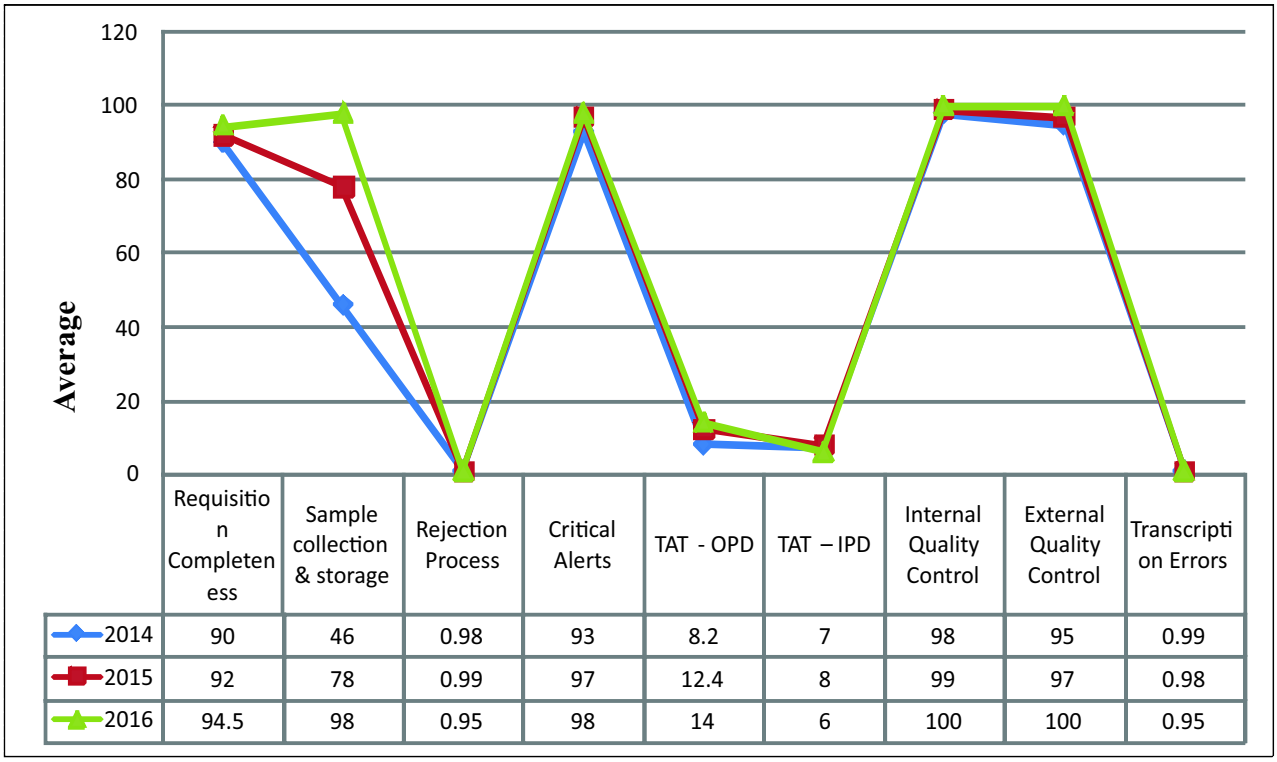
Table 1: Level wise performance and quality assessment tools.

Quality Indicators	Phase of lab work flow	(IOM) Domain.	Performance Target	Assessment tool
Requisition Completeness	(System/pre-analytics)	Effectiveness,efficiency, timeliness,safety	100 %	Test order, accuracy and appropriateness
Sample collection & storage	(Pre-Analytics)	Effectiveness,efficiency, timeliness,safety	100 %	Patient identification and Rejection criteria Fulfillness.
Sample Rejection Process	(Pre-Analytics)	Efficiency, safety.	< 01 % =100%	Sample adequacy, Accuracy & information
Critical Values Reporting	(Post-Analytics)	Timeliness, safety	100%	Report Generation time, information time and acknowledge.
TAT – OPD	(Post-Analytics)	Clinical relevancy, Timeliness.	(Permissible limit 5%) 05 %=100%	Crude /Balance TAT location & acknowledge (Permissible limit 5%)
TAT – IPD	(Post-Analytics)	Clinical relevancy, Timeliness.	(Permissible limit 5%) 05 %=100%	Crude /Balance TAT location & acknowledge (Permissible limit 5%)
Internal Quality Control	(Analytics)	Efficiency, Safety.	100 %	Accuracy of point-of-care testing.
External Quality Control	(System/Post-Analytics)	Effectiveness,efficiency, timeliness,safety	100 %	Quality assurance, Customer& clinician satisfaction.
Transcription Errors	(System/Post-Analytics)	Effectiveness, timeliness.	< 01 %=100%	Report accuracy, critical value report, TAT & and clinicians follow up.

and network problems during telephonic communications. However, there was noticeable improvement after implementation of HMIS. TAT has shown a major improvement.

There were many reasons like delay in receiving the samples from IPD station to laboratory, delay in releasing of reports due to system problems, increased workload and only a single Manpower with devices (.i.e. disparity between stretch ability of manpower in place and workload) leads to delay in release of reports and dispatch of reports from collection station to respective wards and OPDs. The reasons for delay were identified and measures taken to correct the problems by using HMIS. The better performances were achieved in specimen collection & storage, completeness of requisition forms, specimen rejection, by organizing a committee for regular training program on the following parameters namely employee competence, client relationships, efficiency of laboratory information System and efficiency of laboratory staff administered to residents, technicians, phlebotomists and clinicians for improving every site and every manpower entrusted in varied spaces of technical interventions, processes and outcome assessed activities. After training and education of the laboratory associated staffs, there was a remarkable improvement in all these indicators [5,9].

The study was done on certain laboratory test related quality indicators viz. assessment tools, IOM domain, phase of lab work flow and performance targets. The laboratory indicators required focus on



	Requisition Completeness	Sample collection & storage	Rejection Process	Critical Alerts	TAT - OPD	TAT – IPD	Internal Quality Control	External Quality Control	Transcription Errors
2014	90	46	0.98	93	8.2	7	98	95	0.99
2015	92	78	0.99	97	12.4	8	99	97	0.98
2016	94.5	98	0.95	98	14	6	100	100	0.95

Figure 1 : Upgradation &Evaluation of Performance Ratio by Quality Indicators.

standardized terminology, measurement specifications, data collection methods, evidence establishing quality gaps and relationship to process. These ultimately target clinical, health, and economic outcome.

The importance of herein identified quality indicators are identified as essentials for due emphasis at all possible platforms of stakeholder interactions through sharing of quality enhancing approaches, fundamentals and practical understanding for present and future application. 'Internal Quality Control Indicators' are however observed to be unlike 'External' ones. These indicators are not adhered to due to disproportionate workload in high volume settings.

Work analysis reveal in certain laboratories the quality indicators are not applied at various stages of the individual and comprehensive laboratory testing process or the IOM domains of health care while ensuring justice for the beneficiaries. The relevant basics of patient centeredness viz advisory services, participatory and shared decision making are not usually evaluated in the area of laboratory testing. These must include involving patients in the decision making to ensure values, preferences, understanding of laboratory results, possible future clinical and preventive actions[8,10].

CONCLUSION:

The concept of quality indicators has revolutionized the field of laboratory medicine. These indicators are of great importance for comparing individual laboratory performance with the aim of improving laboratory services and quality [8, 9]. It is now possible to compare our laboratory functions with others by simply evaluating these indicators. It is important to note that the quality of work should, however, not be compromised due to the quantity. We should strive to reach these benchmarks to provide best services to society.

Quality management System must follow the up-gradation cycle and after target achievement should reset objectives and complete the cycle with fulfillment of desired indicators for better services tools viz set objectives through(System),validate results by (IQC,EQC) and clinical relevance monitoring by (IQC,EQC). Beneficiary expectation through better implication and formatting in advisory services, matching of all benchmarks must be modulated and implemented through System. It is also inferred that the regulations should be in resonance

Table 2: Comparison of quality indicator wise performance over three consecutive years.

Quality Indicators	Assessment Tools	2014 Performance	2015 Performance	2016 Performance	Target
Requisition Completeness (System/pre-analytics)	Test order, accuracy and appropriateness	90 %	92 %	94.5 %	100 %
Sample collection & storage (Pre-Analytics)	Patient identification and Rejection criteria Fulfillness .	46 %	78 %	98%	100 %
Sample Rejection Process (Pre-Analytics)	Sample adequacy, Accuracy & information	0.98 %	0.99 %	0.95 %	< 01 % =100%
Critical Values Reporting (Post-Analytics)	Report Generation time, information time and acknowledge.	93 %	97 %	98 %	100 %
TAT – OPD (Post-Analytics)	Crude /Balance TAT location & acknowledge (Permissible limit 5%)	8.2 %	12.4 %	14 %	05 %=100%
TAT – IPD (Post-Analytics)	Crude /Balance TAT location & acknowledge (Permissible limit 5%)	7.0 %	08 %	06 %	05 %=100%
Internal Quality Control (Analytics)	Accuracy of point-of-care testing	98 %	99 %	100 %	100 %
External Quality Control (System/Post- Analytics)	Quality assurance, Customer& clinician satisfaction.	95 %	97 %	100 %	100 %
Transcription Errors (System/Post- Analytics)	Report accuracy, critical value report, TAT & and clinicians follow up.	< 0.99 %	0.98 %	0.95 %	< 01 %=100%

with the systems in place. Hence quality indicators, external and internal, are needed for persistent observance under close scrutiny.

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