Original Article

Perceived and Real Histopathology Turnaround Time: A Teaching Hospital Experience

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Abstract

Background: This study aims to audit analytic turnaround time (TAT) in a histopathology laboratory with a view to assessing the timeliness of its reports, identify causes of delay in its TAT, and compare this with client perception of its performance. **Materials and Methods:** Records of 1440 batches of specimens processed over a 5-year period in the histopathology laboratory of a teaching hospital were retrieved from archives. From these, median and mean TATs were calculated and causes of delay identified. Questionnaires were also deployed to assess physicians' perception of the laboratory's performance. **Results:** Analytic TAT was 3.6 ± 2 days, with 86.7% of reports being ready within 5 working days. The delays in timeliness of report generation were due mainly to residency training-related factors; tissue processing-related factors, and inadequate clinical information among others. Client perception of TAT rated the laboratory below average by 18.4%; average by 57.5%; good by 20.7%, and excellent in its performance by 3.4% of respondents. **Conclusion:** Even though physicians perceived the laboratory's TAT to be just average, its analytic TAT for reports is within acceptable international standards but with room for improvement in its performance.

Keywords: *Clients, histopathology, reports, turnaround time*

Introduction

Turnaround time (TAT) as a concept generally implies the time taken from commencement of a process to its termination. In laboratory practice, TAT appears to be the most important yardstick for measuring physician satisfaction with laboratory performance. Short TAT facilitates prompt decision-making in patient management and this influences hospital stay and cost of hospitalization. The size of the institution, extent of automation, and number of personnel, among other factors may affect the laboratory's mean TAT.[1]

The laboratory for this study is in a tertiary health facility where not only pathology services are rendered, but residency training in pathology is also offered. It is semi-automated and receives specimens from within and outside its parent hospital. The department, in the period being audited, had four pathologists on ground, ten resident doctors, and two histoscientists.

Preanalytic phase commences with biopsy taken by the surgeon, including laboratory accessioning of the specimen, surgical cut-up (grossing) by the resident doctor, and tissue processing into slides by the histoscientist. These usually take about 24 h (longer for biopsies from outside). The analytic phase commences when the resident doctor receives and the slides. He/she then screens them and reviews them with the consultant pathologist the following morning. The analytic phase ends with editing of signed-out reports. The duration for this is variable and most often the most contentious.

This study, therefore, aims to audit the intralaboratory phases, particularly its TAT to ensure comparability with international best practices. This will facilitate better

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interprofessional understanding of expectations and limitations.

Materials and Methods

The 23,886 routine and complex surgical pathology specimens that were received over a 5-year period and processed in about 1440 batches constituted the audit sample size. We adopted the CLIA 88 guidelines which advocates at least 10% rescreening of cytology slides for audit purposes.[2] Employing this tool, 150 batches were then selected, and the median TAT was determined for each batch, and then, the overall mean TAT was calculated. Resident doctor's slide-reception registers where dates of slide reception and sign-out are documented were used for the calculation of this interval. The estimated times excluded weekends and public holidays.

Client satisfaction with the laboratory's performance was assessed by distributing 100 questionnaires (appendix) to the four major clinical departments in the parent hospital. These comprised surgery, pediatrics, internal medicine and gynecology, each receiving 25 questionnaires due to fairly even numbers of doctors in those departments. Their perception of the laboratory's performance was rated as: below average, average, good, and excellent.

Results

The intralaboratory preanalytical phase of specimen handling of the 150 batches comprised surgical cut-up and tissue processing. This phase, up to slide production, fairly took about 24 h. The analytic phase, on the other hand, was more variable and had a median of 2 days and mean of 3.6 ± 2 days. Our percentage of outliers, that is, the number of TAT that exceeded the median benchmark divided by the total number of TATs was 48.6%. As shown in Table 1, the sign-out TAT varied from 40.7% at day 1% to 90.7% at day 5. The total time (pre- and post-analytic) taken to analyze the 150 batches shows that 0% was completely analyzed by day 1 with the number increasing progressively to 86.7% by day 5. Fourteen (9.3%) of the 150 cases were not signed out within 5 days as shown in Table 2. Resident doctor training-related delays (such as delays in slide presentation by residents to consultants, teaching residents during slide review and delays due to result descriptive errors which have to be corrected before release) accounted for 42.9% overall of cases not signed out within 5 working days. This was followed in magnitude by tissue reprocessing delays accounting for 28.6% of delays. Inadequate clinical information, intradepartmental consultation, and special staining requests accounted for 14.3%, 7.1%, and 7.1% of delays, respectively.

Of the 100 questionnaires dispatched, 87 (87%) were returned. In terms of its TAT, as shown in Table 3, the laboratory was rated as below average by 18.4%; average by 57.5%; good by 20.7%, and excellent in its performance by 3.4% of respondents. The laboratory's best performance was in the comprehensiveness of its reports; reliability of its reports, and accessibility of its Pathologists. These were perceived as being good by (52.9%), 67.8% and 54.0% of raters, respectively. Overall, the laboratory was rated as being good (47.6%).

Table 1: The median and percentage sign-out and total analytic turnaround time for the audited batches of specimens

Median TAT (working days)	Signed-out (*n*)	Percentage	Cumulative (%)	Cumulative percentage analyzed
1	61	40.7	40.7	-
2	30	20.0	60.7	40.7
3	26	17.3	78.0	60.7
4	13	8.7	86.7	78.7
5	06	4.0	90.7	86.7
>5	14	9.3	100.0	100.0

TAT: Turnaround time

Table 2: Reasons for and percentages of causes of delays in analytical turnaround time

Causes of delay >5 days	Number of delayed cases	Percentage of delayed cases	Percentage of total cases
Training-related	6	42.9	4.0
Reprocessing	4	28.6	2.6
Inadequate clinical information	2	14.3	1.3
Intradepartmental consultation	1	7.1	0.7
Special staining	1	7.1	0.7
Total	14	100	9.3

Table 3: Physician perception of laboratory performance

	Less than average	Average	Good	Excellent
TAT	16	50	18	3
Comprehensiveness of report	4	29	46	8
Reliability of report	1	19	59	8
Accessibility to pathologist	7	22	47	11
Courtesy of laboratory staff	8	37	36	6
Total (%)	36 (8.2)	157 (36.0)	208 (47.6)	36 (8.2)

TAT: Turnaround time

Discussion

Analytic TAT, defined as time taken from slide submission to availability of a report, was 3.6 ± 2 days, with 86.7% of cases being signed out within 5 working days. This is comparable to the 89% completion rate within 6 days documented by Coard and Gibson in the West Indies but lower than the 97.9% within 5 working days documented by Novis *et al*. in a study of 157 laboratories across America, Canada, and Australia. Similarly, our median 2 days sign-out TAT is slower than the 1-day median sign-out TAT documented in the latter study.[3,4] Our 40.7% sign-out rate at day 1 is also slower than the 1 day TAT obtained in 73.4% of cases in a study from Australia.[5] However, this Australian facility was not involved in residency training. There is a paucity of literature on diagnostic turnaround in surgical pathology laboratories in Nigeria. However, an earlier study on audit of surgical pathology carried out by Malami and Iliyasu in Kano, Nigeria, documented a TAT range of 2–16 days with a mean of 6.2 days. More than 75% of the specimens were completed within 7 days.[6] The index study had a more favorable outcome (mean TAT 3.6 ± 2 days, with 86.7% signed-out within 5 working days) due to increase in number of both consultants and residents in our center.

In our laboratory, sign-out stage was however plagued by several variables and while intralaboratory factors constituted about 85.7% of causes of delay, the study by Guo *et al*. showed that intralaboratory factors constituted delays in 66.5% of their routine biopsies, and 49.1% of their operative specimens.[7] Cases delayed included those requiring immunohistochemistry, in which batching is done to minimize costs and cases needing decalcification or recuts. In addition to those highlighted in Table 2, other causes of delay beyond 5 days included high case to personnel ratio; and irregular power supply to run microscopes. With 2 laboratory technologists and 4 pathologists and average workload >2200 cases per pathologist per year (excluding cytopathology and autopsy cases), this constituted a negative influence on mean sign-out TAT and is consistent with findings by Zarbo *et al*. in a Q-Probe for College of American Pathologists who also documented the negative influence of low personnel to case ratio.[1]

Residency training-related issues accounted for 42.9% of the 14 cases not signed out within 5 working days. This is however lower than the 10% the same factor contributed to delays in an English teaching hospital.[8] Zarbo *et al*.[1] has rightfully observed that incorporation of residency training into the laboratory's functions, as is the case in ours, may lengthen analytic TAT. Studies have also shown evidences that the involvement of resident doctors in gross tissue dissection and microscopic sign-out contribute significantly to increases in TAT.[4] Similar observations have been made for delays resulting from intradepartmental consultation between pathologists on difficult cases, and this accounted for 7.1% of delayed cases in our center. The same factor resulted in delay of 13% of cases in a study conducted by Renshaw and Gould.[9]

The inadequacy of clinical information resulting in delays in sign-out of cases was another contributor and accounted for 14.3% of delays. This is higher than the 6.1% documented by Burton and Stephenson but lower than the 32% recorded by Nakhleh *et al*. in their study of impact of clinical information on delay in sign-out of surgical pathology cases.[10,11]

Even though the calculated TAT for the laboratory has compared fairly well with centers in more developed countries not bedeviled by some of the challenges highlighted thus far, the perception of our laboratory's TAT by its physicians has been mostly of average performance (57.5%). A study by Grzybicki *et al*. analyzing physicians' perception of TAT for surgical pathology and cytology, discovered that physicians perceived TAT to be longer than the actual laboratory TAT[12] most of this dissatisfaction appears to arise from inadequate communication concerning real laboratory TAT and challenges faced; as well as need to ensure robust inter-professional interaction. However, the laboratory's perceived marginally fair performance in this respect appears to have been offset by the comprehensiveness and reliability of its reports, yet with room for improvement in all surveyed parameters.

Conclusion

Even though the pre- and post-analytic TATs of this teaching hospital's pathology laboratory are within international standards, yet physician perception and satisfaction with its performance appear fairly out of synchrony. This suggests the need for more robust inter-professional interaction. The study also brings to the front burner the need for clinical laboratories not to shy away from self-auditing and conduction of client satisfaction surveys.

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Conflicts of interest

There are no conflicts of interest.

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