

Laboratory Turnaround Time of Surgical Biopsies at a Histopathology Service in Nigeria

Innocent Emmanuel^{1,2}, Samuel Abaniwo², Patrick Nzekwe², Samuel Kelechi Richard², Olufunmilayo Abobarin³, Abdulaziz Longwap⁴, Alhamdu Joseph⁵

¹Department of Histopathology, University of Jos, Jos, Nigeria, ²Department of Histopathology, Jos University Teaching Hospital, Jos, Nigeria, ³Department of Anatomical Pathology, Bingham University Teaching Hospital, Jos, Nigeria, ⁴Department of Chemical Pathology, Bingham University Teaching Hospital, Jos, Nigeria, ⁵Department of Academy and Cadets Matters, Nigerian Defence Academy, Kaduna, Nigeria

Abstract

Introduction: Laboratory turnaround time is defined as the time between the receipt of a sample in the laboratory and when the report is ready for collection/dispatch. It is a critical component of the quality assurance of a laboratory and has been identified as a key performance indicator of laboratory performance. This study is aimed at evaluating the turnaround time in the histopathology unit of our center and comparing the findings with that of similar studies. **Methodology:** This was a prospective descriptive study of the first 500 consecutive samples of surgical biopsies submitted for analyses at the Histopathology Department of the Jos University Teaching Hospital. The samples were tracked from the reception desk, where they are submitted to the dispatch point where the results are collected by clients. The grossing time (T1), processing time (T2), reporting time (T3), and the transcription time (T4) were recorded for each sample. The data obtained were analyzed using SPSS software and presented as simple frequencies and percentages. **Results:** The mean laboratory turnaround time was 7.5 + 9.7 days with a range of 3–18 days. As much as 20.8% of reports were ready for dispatch by day 3 and 100% by day 18. Overall, the grossing time (T1), processing time (T2), reporting time (T3), and transcription (T4) time consumed 17.5%, 35.5%, 27.7%, and 19.3% of the total time spent, respectively. **Conclusion:** We recommend the development of practicable targets for the histopathology laboratories as regards timeliness. This should be regularly evaluated to ensure compliance and improvement of service quality in this regard.

Keywords: Histopathology, laboratory, turnaround time

INTRODUCTION

In the hospital setting, laboratory TAT (LTAT) is the time between the receipt of a sample in the laboratory and when the report is ready for collection/dispatch.¹⁻⁶ LTAT is a critical indicator of laboratory performance.⁷⁻¹⁴ Delay in issuance of reports contributes to prolonged patients' treatment-waiting time, decreases satisfaction, and increases hospital cost.¹⁵

Pathology practice in developing countries has reportedly been characterized by system delays associated with obtaining, processing, and reporting analyzed samples. This study is aimed at evaluating the TAT in the histopathology unit of our center and comparing the findings with that of similar studies.

METHODOLOGY

This was a prospective descriptive study of the first 500 consecutive surgical samples submitted for analyses at

the Histopathology Department of the Jos University Teaching Hospital. The samples were tracked from the reception where they were submitted to the point where the results were ready for collection by clients.

The time interval between these extremes (the laboratory turnaround time) was segmented into four composite parts (proportion of samples undergoing procedures completed over time). The grossing time (T1) is the time (in days) between sample submissions and the moment grossing is completed.

Address for correspondence: Dr. Innocent Emmanuel, Department of Histopathology, University of Jos, P.M.B. 2084, Jos, Nigeria. Department of Histopathology, Jos University Teaching Hospital, P.M.B. 2076, Jos, Nigeria. E-mail: kinapele58@yahoo.com

Submitted: 20-May-2020 **Revised:** 25-Jun-2020

Accepted: 10-Jul-2020 **Published:** 04-Aug-2020

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Emmanuel I, Abaniwo S, Nzekwe P, Richard SK, Abobarin O, Longwap A, *et al.* Laboratory turnaround time of surgical biopsies at a histopathology service in Nigeria. *Niger Med J* 2020;61:180-3.

Access this article online

Quick Response Code:



Website:
www.nigeriamedj.com

DOI:
10.4103/nmj.NMJ_173_20

This is followed by the processing time (T2) (the period during which the tissue is processed), the time between the completion of grossing of a tissue and submission of histological slides for reporting. Therefore, T1 and T2 constitute the preanalytical phase. The reporting time (T3) represents the period of reporting and is defined as the interval between the submission of samples for reporting and the time it is sent out for typing. It is the analytical phase. Finally, the transcription (T4) time (the postanalytical phase) is the period during which the reports undergo typing, proofreading, and printing. Reports are immediately ready for collection/dispatch. All times were consecutive calendar days including the weekend. The data obtained were analyzed using Statistical Package for the Social Sciences (SPSS) software (IBM. SPSS statistics for Windows. Version 21.0. Armonk, NY: IBM; 2017) and presented in Table 1 as simple frequencies and percentages.

Only the four authors of this work who are primary staff of the laboratory with a total of 43 staff were aware that this study was ongoing.

There were no ethical issues as the research does not involve the direct use of patients' information or diagnosis reached on samples, but strictly time intervals.

RESULTS

The mean laboratory turnaround time was 7.5 ± 9.7 days with a range of 3–18 days. As much as 20.8% of reports were ready for dispatch on day 3 and 100% on day 18 [Table 1]. The mean grossing time, processing time, reporting time, and transcription time were 1.6 ± 1.6 days, 3.5 ± 3.8 days, 1.9 ± 5.0 days, and

1.1 ± 2.5 days, respectively, with corresponding ranges of 1–5 days, 1–8 days, 1–8 days, and 1–4 days.

The proportion of samples grossed, processed, reported, and transcribed on day 1 were 59.6%, 17.0%, 43.8%, and 87.6%, respectively.

Overall, the grossing time (T1), processing time (T2), reporting time (T3), and transcription (T4) time consumed 17.5%, 35.5%, 27.7%, and 19.3% of the total time spent, respectively.

DISCUSSION

Turnaround time in the laboratory is an integral component of quality assurance.^{12,14} In this study, it ranges between 3 and 18 days. Similar values of 2–16 days and 2–27 days were reported in Kano, Nigeria, and Barcelona, Spain, respectively.^{16,17} Furthermore, a report from Eldoret, Kenya, of 3–59 days was however higher.¹⁴ Furthermore, the mean of 7.5 ± 9.7 days in our study is similar to 6.2 days in Kano,¹⁶ 6.24 ± 3.16 days in Spain,¹⁷ but lower than the 16.2 ± 10.20 days in Kenya.¹⁴ Furthermore, a study from Rwanda presented a median of 32 days for LTAT.¹¹ It was reported that the gap between developing and developed countries in TAT is attributable to factors bordering on intralaboratory constraints, interprofessional rivalry, poorly structured internal/external quality assurance programs, inadequate infrastructures, politics, and the economy.¹⁸ However, this study suggests a glimmer of hope in the drive toward efficiency of the developing countries in this regard.

LTAT could be graded based on the proportion of requests completed with the passage of time. The College of American

Table 1: Distribution of time intervals as proportion of samples undergoing procedures completed over time (days) toward turnaround time in surgical pathology

Day(s)	Proportion of samples completed in composite parts of LTAT				
	T1=Grossing time (%)	T2=Processing time (%)	T3=Reporting time (%)	T4=Transcription time (%)	Total=LTAT=T1 + T2 + T3 + T4 (%)
1	59.6	17.0	43.8	87.6	-
2	74.2	32.0	63.4	92.4	-
3	92.4	49.4	71.2	94.4	20.80
4	97.6	63.6	76.2	100.	33.00
5	100.0	76.0	80.8	-	43.00
6	-	93.8	86.0	-	54.80
7	-	94.6	87.4	-	64.20
8	-	100.0	100.0	-	73.20
9	-	-	-	-	81.80
10	-	-	-	-	88.40
11	-	-	-	-	92.40
12	-	-	-	-	95.20
13	-	-	-	-	97.40
14	-	-	-	-	98.40
15	-	-	-	-	99.40
16	-	-	-	-	99.60
17	-	-	-	-	88.80
18	-	-	-	-	100.00

LTAT – Laboratory turnaround time

Pathologists recommended that LTAT for routine surgical biopsies should be no longer than 2 days, with more complex cases lasting longer.^{19,20} The Royal College of Pathologists recommended in 2013 that the percentage of diagnostic biopsies reported, confirmed, and authorized within 7 days of biopsy should be 80%. However, at a later date in 2014, the threshold was pegged at 90%. Furthermore, the percentage of all histopathology and diagnostic cytology final reports available within 10 calendar days of procedure be earlier pegged at 80% increased to 90% by April, 2014.²¹ The Royal College of Pathologists of Ireland gave a target of 80% of cases be completed by day 5.² Our online search showed that national or local guidelines on LTAT in histopathology were not readily available. This calls for a deliberate action by the authorities in developing countries to build capacity and ensure sustainable timelines and accountability in order to bridge the gap in this regard.

We recorded an LTAT of 20.80%, 54.80%, 73.20%, and 92.40%, respectively on days 3, 6, 8, and 11. Volmar *et al.* in an American Q-Probes study involving 56 institutions with reports on 2763 large or complex histology cases found a median turnaround time of 2.72 days.²² In Ireland, a hospital met national standards in 2017 with 80% of small and endoscopic biopsies being reported by day 5, while 80% of cancer and noncancer resections were reported by day 7.²³ This difference between our center and these Western nations is attributable to the factors highlighted above.

In this study, we found the preanalytic, analytic, and postanalytic phases accounting for 53.0%, 27.7%, and 19.3%, respectively, of the total time consumed. A Nigerian study by Uchendu¹⁸ reported a similar finding: 57.9%, 28.1%, and 13.9%, respectively. The analytic phase in histopathology is the exclusive duty of the anatomical pathologist¹² and was found in this study to have a mean of 1.9 ± 5.0 days and range of 1–8 days. This was better than the reported mean of 3.6 ± 2 days in Kenya by Macbaria *et al.*¹⁴ and the 2.5 ± 3.2 days in Nigeria by Atanda *et al.*²⁴ The rate of reporting on day 1 was 43.8% in this study, a value similar to the 40.7% reported in Nigeria,²⁴ but lower than the 73.4% in Australia.²⁵

CONCLUSION

This study showed that although a gap exists in the LTAT between developed and developing climes, some improvements have so far been noticed. We therefore recommend the development of practicable targets for the histopathology laboratories as regards timeliness. This should be regularly evaluated to ensure compliance and improvement of service quality in this regard.

Financial support and sponsorship

Nil.

Conflicts of interest

Four of the seven authors in this study are part of the 21 doctors that are routinely involved in surgical pathology services in

the laboratory based on their schedule. They also are part of the 43 staff of the laboratory as a whole involved in the entire turnaround time process.

REFERENCES

- Breil B, Fritz F, Thiemann V, Dugas M. Mapping turnaround times (TAT) to a generic timeline: A systematic review of TAT definitions in clinical domains. *BMC Med Inform Decis Mak* 2011;11:34.
- Faculty of Pathology-Royal College of Physicians of Ireland. Histopathology National Quality Improvement Programme Data Report 2015; July 2016. Available from: <https://rcpi-live-cdn.s3.amazonaws.com/wp-content/uploads/2016/09/Histopathology-National-Quality-Improvement-Programme-Data-Report-2015-Track-updates.pdf>. [Last retrieved on 2020 May 05].
- Jerjes W, Upile T, Radhi H, Petrie A, Adams A, Callear J, *et al.* Delay in pathological tissue processing time vs. mortality in oral cancer: Short communication. *Head Neck Oncol* 2012;4:14.
- Dey B, Bharti JN, Chakraborty M. Laboratory turnaround time. *Int J Health Sci Res* 2013;3:82-4.
- Anatomical Pathology Advisory Committee. Turnaround Time in Anatomical Pathology. Royal College of Pathologist of Australia; 2015. Available from: <https://www.rcpa.edu.au/Library/College-Policies/Guidelines/Turnaround-Time-in-Anatomical-Pathology>. [Last retrieved on 2020 May 10].
- Westbrook JI, Georgiou A, Rob MI. Computerized order entry systems: Sustained impact on laboratory efficiency and mortality rates?. *Stud Health Technol Inform* 2008;136:345-50.
- Hawkins CR. Laboratory turnaround time. *Clin Biochem Rev* 2007;28:179-94.
- Ali SM, Kathia UM, Gondal MU, Zil-E-Ali A, Khan H, Riaz S. Impact of clinical information on the turnaround time in surgical histopathology: A retrospective study. *Cureus* 2018;10:e2596.
- Uchendu OJ, Eze GI. Intralaboratory Turnaround Time (TAT) in a developing country: An audit of a histopathology department of a Nigerian Teaching Hospital. *Ann Trop Pathol* 2013;4:41-5.
- Travers H. Quality assurance indicators in anatomic pathology. *Arch Pathol Lab Med* 1990;114:1149-56.
- Mpunga T, Tapela N, Hedt-Gauthier BL, Milner D, Nshimiyimana I, Muvugabigwi G, *et al.* Diagnosis of cancer in rural Rwanda: Early outcomes of a phased approach to implement anatomic pathology services in resource-limited settings. *Am J Clin Pathol* 2014;142:541-5.
- AnandrajVaithy K, Shanmugasamy K, Anandhani G, Kotasthane SD. Analysis of quality assurance: A novel step in fixing the turn-around time of surgical pathology reports as a part of quality management system. *IP J Diagn Pathol Oncol* 2017;2:100-3.
- Key Performance Indicators in Pathology. Recommendations from the Royal College of Pathologists. First published 2011. Corrected and Reissued; April 2013. p. 1-23. Available from: <https://www.rcpath.org/uploads/assets/e7b7b680-a957-4f48-aa78e601e42816de/Key-Performance-Indicators-in-Pathology-Recommendations-from-the-Royal-College-of-Pathologists.pdf>. [Last retrieved on 2020 May 10].
- Macbaria BN, Diangui FM, Lcbumba DK. Evaluation Of Turnaround time of biopsy and surgical specimens in Mol Teaching And Referral Hospital, Eldoret Kenya. *Kenya JHealth Sci* 2015; 3:16-22.
- Shih-Chou K. Monitoring turnaround time using an average control chart in the laboratory. *Int J Ind Eng* 2012;19:476-87.
- Malami SA, Iliyasu Y. Local audit of diagnostic surgical pathology as a tool for quality assurance. *Niger J Med* 2008;17:186-90.
- Ribé A, Ribalta T, Lledó R, Torras G, Asenjo MA, Cardesa A. Evaluation of turnaround times as a component of quality assurance in surgical pathology. *Int J Qual Health Care* 1998;10:241-5.
- Uchendu OJ. Challenges of practicing histopathology in a developing country: The Nigerian perspective. *Ann Biomed J* 2013;12:68-74.
- Patel S, Smith JB, Kurbatova E, Guarner J. Factors that impact turnaround time of surgical pathology specimens in an academic institution. *Hum Pathol* 2012;43:1501-5.

20. Zarbo RJ, Gephardt GN, Howanitz PJ. Intralaboratory timeliness of surgical pathology reports. Results of two College of American Pathologists Q-Probes studies of biopsies and complex specimens. *Arch Pathol Lab Med* 1996;120:234-44.
21. Key Performance Indicators in Pathology. Recommendations from the Royal College of Pathologists; 2013. Available from: <https://www.rcpath.org/uploads/assets/e7b7b680-a957-4f48-aa78e601e42816de/Key-Performance-Indicators-in-Pathology-Recommendations-from-the-Royal-College-of-Pathologists.pdf>. [Last retrieved on 2020 May 05].
22. Volmar KE, Idowu OM, Souers JR, Karcher SD, Nakhleh ER. Turnaroundtime for large or complex specimens in surgical pathology: A college of American Pathologists Q-Probes Study of 56 Institutions. *Arch Pathol Lab Med* 2015;139: 171-7.
23. Histopathology/Cytology Turnaround Times – When should I Expect a Report to be Issued? St. James Hospital. St. James’s Hospital. Available from: <http://www.stjames.ie/Departments/DepartmentsA-Z/H/HistopathologyCytology/DepartmentinDepth/TurnAroundTimes/>. [Last retrieved on 2020 May 05].
24. Atanda AT, Yusuf I, Haruna MS. Perceived and Real Histopathology Turnaround Time: A Teaching Hospital Experience. *Niger J Surg* 2017;23:98-101.
25. Kazzi JC, Lloyd PJ, Bryant S. Turnaround times for reports on uncomplicated biopsies in five major anatomical pathology laboratories in NSW, Australia. *Pathology* 1999;31:406-12.