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ORIGINAL RESEARCH

Turnaround time of Surgical pathology reports in a Nigerian tertiary hospital

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Abstract

Background: Timely reporting of surgical pathology specimens is essential for prompt clinical decision-making and improved patient outcomes. Turnaround time (TAT) in surgical pathology is the time from specimen receipt in the histopathology laboratory to the release of the final report. International guidelines recommend a TAT of 2–5 days for routine cases, but many resource-limited settings often exceed this.

Objectives: This study aimed to assess the turnaround time for surgical pathology reports at a tertiary care teaching hospital in Sagamu, southwestern Nigeria, over a one-year period and to identify factors contributing to TAT delays.

Methods: We conducted a retrospective, descriptive study of 1,016 consecutive surgical specimens received by the Department of Morbid Anatomy and Histopathology at Olabisi Onabanjo University Teaching Hospital from January to December 2024. We analyzed TAT in four key phases: grossing time (T1), processing time (T2), reporting time (T3), and transcription time (T4). We recorded data in calendar days and analyzed them using SPSS version 22.

Results: The mean laboratory turnaround time (LTAT) was 6.49 ± 2.47 days (range: 4–17 days). Processing time (T2) was the longest phase, accounting for 63.6% of total TAT. Orthopedic specimens had the longest mean LTAT (11.03 ± 4.74 days), whereas Urology specimens had the shortest LTAT (5.44 ± 2.06 days).

Conclusion: The observed LTAT is comparable to the time frame reported in other resource-limited settings but remains longer than internationally recommended benchmarks. Delays were primarily due to specimen processing times.

Keywords: Digital pathology, Histopathology, Laboratory efficiency, Nigeria, Surgical pathology, Turnaround time

Introduction

Timely reporting of surgical pathology results is crucial for guiding clinical decisions, ensuring appropriate treatment, and improving patient outcomes.[1] Turnaround time (TAT) in surgical pathology is the time from specimen receipt in the laboratory to the final report release.[2] Delays in TAT can lead to prolonged hospital stays, delayed interventions, increased patient anxiety, and, in some cases, worse prognoses.[3] The College of American Pathologists (CAP) and other international guidelines recommend a TAT of 2–5 days for routine pathology cases; however, many institutions, particularly in resource-limited settings like ours, struggle to meet these benchmarks.[3,4,5,6]

Previous studies have reported considerable variation in surgical pathology turnaround times across healthcare settings. In Nigeria, Adebayo et al. reported a mean TAT of 18 ± 9 days at a teaching health facility in Ogbomosho, while Ajani et al. documented a mean TAT of 22 ± 10 days at a tertiary healthcare facility in Ibadan.[7][8] In contrast, a multicenter College of American Pathologists Q-Probes study by Volmar et al., involving 56 institutions, reported a median TAT of 2.72 calendar days for large or complex surgical pathology specimens.[9] Although differences in specimen characteristics and TAT measurement methods may limit direct comparisons, these findings highlight variations in reporting timelines across healthcare settings and underscore the need for institution-specific assessments.

Several factors influence TAT in surgical pathology, including specimen processing time, case complexity, laboratory workload, and the need for additional testing, such as immunohistochemistry.[3] In tertiary care teaching hospitals, high patient volumes and limited resources may prolong TAT, affecting overall hospital efficiency. Measuring TAT and identifying delays are essential to improving pathology services.[10]

At our institution, the annual volume of surgical pathology specimens increased from 867 in 2021 to 911 in 2022 and 1,005 in 2023, averaging 928 specimens per year. This

represents a 15.9% increase in specimen volume over the three-year period. This rising workload, particularly without a corresponding increase in laboratory personnel and processing capacity, may strain existing resources and contribute to TAT delays.

This study aims to assess turnaround time for surgical pathology reports at a tertiary care hospital in southwest Nigeria over one year. By analyzing TAT and the proportion of cases exceeding recommended benchmarks, this study provides baseline data to guide future strategies to optimize pathology workflows, reduce reporting delays, and ultimately improve patient care.

Methods

This study used a retrospective, descriptive system evaluation design and analyzed 1,016 consecutive surgical specimens received at the Department of Morbid Anatomy and Histopathology, Olabisi Onabanjo University Teaching Hospital, Sagamu, from January 2024 to December 2024. We retrieved and reviewed departmental archival records to determine the time each specimen moved from submission at reception to preparation and availability of the final report for collection. We assessed laboratory turnaround time by dividing the process into four key phases, each representing a distinct segment of the workflow. Grossing time (T1) was recorded as the number of days from specimen submission to completion of the gross examination. Processing time (T2) covered the period required for tissue processing, from the end of grossing to the availability of histological slides for microscopic evaluation. Together, these two phases constituted the laboratory's pre-analytical phase.

The reporting time (T3) was measured from slide submission for microscopic evaluation to the time the pathologist completed the report, representing the analytical phase. Finally, the transcription time (T4), categorized as the post-analytical phase, included the time required to type, proofread, and print the finalized pathology report. Reports were ready for collection once this step was complete.

The study included all surgical specimens the Department of Morbid Anatomy and Histopathology at Olabisi Onabanjo University Teaching Hospital, Sagamu, received during the year under review. Exclusion criteria included cytology samples, surgical samples from within the hospital not submitted to the department for processing, and postmortem samples.

We waived consent because we had no direct contact with the patients, their samples, or their tissue blocks. The study used documented times from the departmental archival records.

We recorded all turnaround times on consecutive calendar days, including weekends. We analyzed the data using the Statistical Package for the Social Sciences (SPSS) version 22 and presented them in tabular format.

Results

The study received 1,016 surgical specimens, with the most from the General Surgery Unit (483 cases, 47.5%) and the fewest from Neurosurgery (6 cases, 0.6%) compared with other departments (Table I).

Table I: Distribution of Surgical Pathology Specimens by Referring Department

Department	Number of Specimens	Percentage (%)
Orthopedics	12	1.2
General Surgery	485	47.7
Gynecology	173	17
Urology	86	8.5
ENT	76	7.5
Ophthalmology	39	3.8
Pediatric Surgery	87	8.6
Neurosurgery	6	0.6
Private/Other Hospital	52	5.1
TOTAL	**1016**	**100**

The mean laboratory turnaround time (LTAT) was 6.5 ± 2.5 days, ranging from 4–17 days (Table II).

Table II: Proportion of samples completed in composite parts of LTAT

Day	T1 (days)	T2 (days)	T3 (days)	T4 (days)	LTAT (days)
1	968	0	406	876	0
2	39	163	223	111	0
3	8	105	187	23	0
4	1	447	55	6	143
5	0	122	41	0	405
6	0	102	66	0	121
7	0	71	19	0	48
8	0	6	19	0	99
9	0	0	0	0	68
10	0	0	0	0	44
11	0	0	0	0	27
12	0	0	0	0	31
13	0	0	0	0	13
14	0	0	0	0	11
15	0	0	0	0	2
16	0	0	0	0	3
17	0	0	0	0	1
Mean	1.1±0.3	4.1±1.4	2.5±1.8	1.2±0.5	6.5±2.5

By day 4, 14.1% of reports were ready for dispatch, and by day 17, all reports were completed (Table III). The mean grossing time (T1) was 1.1 ± 0.3 days (range: 1–4 days), while the mean processing time (T2) was 4.1 ± 1.4 days (range: 2–8 days). The mean reporting time (T3) was 2.5 ± 1.8 days (range: 1–8 days), and the mean transcription time (T4) was 1.2 ± 0.5 days (range: 1–4 days). On day 1, 95.3% of samples were grossed. In terms of total turnaround time distribution, grossing time (T1), processing time (T2), reporting time (T3), and transcription time (T4) accounted for 16.3%, 63.6%, 38.2%, and 18.0% of the total

processing duration, respectively.Samples from the Orthopedics department had the longest mean LTAT (11.0 ± 4.7 days), whereas those from the Urology department had the shortest mean LTAT (5.4 ± 2.1 days). Samples from General Surgery and Gynecology had mean LTATs of 6.2 ± 2.9 days and 6.4 ± 2.2 days, respectively (Table IV).

Table III: Cumulative percentage of samples completed in each TAT phase

Day	T1 (%)	T2 (%)	T3 (%)	T4 (%)	LTAT (%)
1	95.3	0	39.9	86.2	-
2	99.1	16	61.9	97.2	-
3	99.9	26.4	80.3	99.4	-
4	100	70.4	85.7	100	14.1
5	-	82.4	89.8	-	53.9
6	-	92.4	96.3	-	65.8
7	-	99.4	98.1	-	70.6
8	-	100	100	-	80.3
9	-	-	-	-	87.0
10	-	-	-	-	91.3
11	-	-	-	-	94.0
12	-	-	-	-	97.0
13	-	-	-	-	98.3
14	-	-	-	-	99.4
15	-	-	-	-	99.6
16	-	-	-	-	99.9
17	-	-	-	-	100

Table IV: Mean Laboratory Turnaround Time of Surgical Pathology Specimens by Referring Clinical Departments

Department	Mean LTAT (days)	SD
Orthopedics	11.0	4.7
General Surgery	6.2	2.9
Gynecology	6.4	2.2
Urology	5.4	2.1
ENT	6.5	2.0
Ophthalmology	7.2	2.0
Pediatric Surgery	6.4	2.3
Neurosurgery	9.2	3.1
Private/Other hospitals	6.6	2.1

Discussion

Turnaround time in the laboratory is a critical quality indicator in surgical pathology, influencing clinical decision-making and patient management. This study evaluated the LTAT for surgical pathology reports at Olabisi Onabanjo University Teaching Hospital, Sagamu (OOUTH), over a 12-month period. Our findings showed a TAT of 4–17 days and a mean LTAT of 6.5 ± 2.5 days. Similar values of 2–18 days and 2–15 days were reported in Jos, Nigeria, and Lahore, Pakistan. respectively.[11,12] However, a report from rural Rwanda indicated a higher TAT of 3–32 days.[13] Additionally, studies conducted in Barcelona, Spain, and Kano, Nigeria, recorded mean LTATs of 6.2 ± 3.2 days and 6.2 days, respectively, whereas a longer mean LTAT was observed in Eldoret, Kenya (16.2 ± 10.2 days). [14,15,16] as well as Ibadan, Nigeria (22 ± 10days). [8]

Factors responsible for discrepancies in LTAT vary by center and may include limited workforce, inadequate infrastructure, intra-hospital and external politics, and economic challenges. [11] Other pre-analytical factors that may affect LTAT include inconsistencies in appropriate processing/transportation media, differences in collection dates before submission to the laboratory, and variations in the volume used for processing specimens. A study by Dey B et al. in India found that the most important factor contributing to delayed TAT is the lack of automated facilities for transporting samples and delivering reports.[1] This contrasts with our findings, where processing times accounted for most of the delay. Other determinants of TAT include distance from the collection site to the lab, incomplete request forms, power failures affecting automated machines, limited

manpower, pathologist availability, report typing and authorization, and system failures.

Delayed pathology reports can affect patient care by prolonging treatment initiation, delaying surgical interventions, and affecting clinical decision-making.[3] Efforts to improve LTAT should focus on streamlining laboratory processes, adopting digital pathology solutions, and improving communication between pathologists and clinicians.[10] Although this study suggests some progress in improving timely pathology diagnosis in developing countries, other studies highlight a persistent gap between developing and developed nations.[13,16] This reflects that comparatively developed nations have more facilities, personnel, and a better working environment that supports workflow than developing nations like ours. Factors contributing to this gap may include laboratory constraints, a limited workforce, inadequate infrastructure, interprofessional rivalry, poorly structured or unavailable quality assurance programs, intra-hospital and external politics, and economic challenges. [11]

The College of American Pathologists recommends that LTAT for routine surgical biopsies should be no longer than 2 days, with more complex cases taking longer.[4] In 2014, the Royal College of Pathologists (UK) recommended reporting, confirming, and authorizing 90% of diagnostic biopsies within 7 days of biopsy.[5] The Royal College of Pathologists of Ireland set a target of 80% of cases completed by day 5. [6] This study recorded LTATs of 14.1%, 70.6%, and 91.3% on days 4, 7, and 10, respectively. A similar study in Jos, Nigeria, reported LTATs of 33.0%, 64.2%, and 88.4% on days 4, 7, and 10, respectively.[11] Currently, Nigeria has no local or national guidelines for LTAT. [11]

Generally, LTAT can be improved in our setting and elsewhere by adopting a strict monitoring protocol to ensure sample processing does not exceed the optimum TAT, increasing the use of automated processes, and improving attention to other nonconforming variables such as regrossing, requests for deeper sections, and recuts of tissue sections.

Limitation of the study: A single-center study in southwestern Nigeria may not reflect other regions of the country.

Conclusion

The observed LTAT in this study is similar to that reported in other developing countries. The delays, particularly in specimen processing, compared with those in developed nations highlight the need for workflow

optimization and the adoption of digital pathology methods. Establishing national LTAT guidelines and implementing quality improvement measures can further enhance timely pathology diagnoses, shorten turnaround time, and improve patient outcomes.

Contribution of authors: ODT, NJI and OAA conceived and designed the study, acquired, analyzed and interpreted the data. NJI, RSK, and ODO conceived and designed the study and acquired, analyzed, and interpreted the data. ODT, NJI and NME conceived and designed the study and interpreted the data. All authors drafted, revised, read, and approved the manuscript.

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