



Laboratory Tests Turnaround Time in Outpatient and Emergency Patients in Nigeria: Results of A Physician Survey on Point of Care Testing

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ABSTRACT

Laboratory analytical turnaround time is a well-recognised indicator of how well a laboratory is performing and is sometimes regarded as the benchmark for laboratory performance. **Methods:** Total 104 doctors in public and private health institutions in Nigeria, spread across all six geo-political zones participated in survey requesting information on their experience with laboratory turnaround times in emergency situations (emergency room, special care baby unit, intensive care unit, dialysis unit) and outpatient situations (general medicine and diabetes). **Results:** The average turnaround time in hours was 5.12, 8.35, 7.32 and 8.33 for the emergency room, special care baby unit, intensive care unit and dialysis unit, respectively. For the outpatient situations, the average turnaround time in hours was 10.74 and 15.70 hours for the diabetes and general medical outpatients. The median range (hours) and modal range (hours) for: the emergency room was 2-4 and <2; the special care baby unit was 4-8 and 4-8; the intensive care unit was 2-4 and 2-4; the dialysis unit was 4-8 and 4-8. The median range (hours) and modal range (hours) for: the general outpatient clinic was 12-24 and 12-24; the diabetic clinic was 4-8 and 12-24 hours. **Conclusion:** These turnaround time results are quite consistent with published data from other countries. However, there is some measure of improvement that is required in some areas to reduce the laboratory turnaround in the emergency situations. This could be overcome with the introduction of more point of care testing devices into emergency units.

Keywords: Turnaround time, Outpatients, Emergency, Laboratory

INTRODUCTION

Alongside accuracy, precision, and reliability of laboratory tests, the timely reporting of laboratory tests, known also as turnaround time is an important indicator of the laboratory quality. Laboratory analytical turnaround time is a well-recognised indicator of how well a laboratory is performing and is sometimes regarded as the benchmark for laboratory performance. The evaluation of the performance of the laboratory's turnaround time is a critical component of understanding the laboratory's performance. The faster the turnaround time the quicker the clinicians can make a diagnosis and put in place a management plan. Clinicians tend to regard turnaround time as the time when the test is requested to when they get the results. This is different from what laboratory professionals who estimate it as when the samples were received at the laboratory to the reporting of the results [1-6].

In the emergency settings, the turnaround time reported in 1965 for an undefined laboratory tests were around 1 hour [7]. In 1983, the average laboratory turnaround time in an emergency department was reported to be 57 min for all tests compared with the average time of the patient spent in the emergency room, which was 195 min. The shortest average turnaround time was 10 min for blood gases, while the longest was 86 min for basic electrolytes and urea. Whilst in the outpatient setting, the average turnaround time for a biochemical profile ranged between 4.7-5.1 hours

and a full blood count, range between 3.7-4.1 hours [8]. A more recent one year study looking at the turnaround time for all, biochemistry samples (both routine and emergency) showed an average of 5.5 hours for routine in patient samples [9] and another study in outpatient had an average of 24 hours [6]. There is an increasing demand for the turnaround time to be reduced with the tests being performed at the point of care using point of care devices [10] and we have previously shown that the access to point of care devices for use in critical care situations was low in Nigeria [11]. In this study, we have evaluated the laboratory turnaround times reported from the hospital doctors in Nigeria in outpatient and emergency situations that took part in the study.

MATERIALS AND METHODS

A total of 109 doctors participated in a cross-sectional paper survey on point of care testing containing questions relating to laboratory testing, turnaround times and point of care testing devices. The questionnaire was a structured self-administered tool with 10 closed ended multiple options questions, which was distributed randomly to doctors who were participants at a medical conference in Nigeria. The respondents were asked to give their consent after a written explanation to the effect that complete confidentiality would be maintained. The raw responses in questionnaire were transferred into a non-coded MS Excel spreadsheet as the primary dataset and delivered to the second author (OO) for individual descriptive statistical analysis. For analysis, the questionnaire questions and answer options were recreated data into a data entry template or 'form' with coded data fields using an EPI-INFO statistical database program. Before data entry the Excel spreadsheet was checked for errors of omissions and inconsistencies of responses. Effort was made during data entry to input data as accurately as possible into the computer template, with further data checks and validation carried out to ensure the completeness and accuracy of data entries before data analysis. To improve the consistency of the analysed data, necessary adjustments were subsequently made to the template to ensure that the same type of response and the same units were entered in same fields for all respondents. Especially, the different units of time given by respondents for the turnaround time were converted into hours. Initial data analysis was carried out by running the frequency of the responses in each data field was carried out using the EPI-INFO Analysis program. Other functions in the program such as 'means' was used to further analyse the distribution of continuous data such the ranges and averages of turnaround time, and 'tables' to identify relationships between relevant variables. The analysis was completed using MS Excel for the tabular and graphical presentations of data. The compilation of the results of statistical analysis was peer-checked and synthesized by the principal author (JB) before a final review individually by the study group.

RESULTS

Demography of respondents

A total of 109 doctors participated in the study, of whom about a quarter were consultants with a specific specialty. These consultants belonged to 10 specialties, about half (13 out of a total of 25) of who were in 3 specialties: Obstetrics and Gynaecology, Chemical Pathology and Paediatrics (Table 1).

Table 1 Specialty of consultants

S. No.	Specialty	Frequency	%	Cumulative %
1	Obstetrics and Gynaecology	5	20	20
2	Chemical Pathology	4	16	36
3	Paediatrics	4	16	52
4	Anaesthesia	3	12	64
5	Haematology	3	12	76
6	Family Medicine	2	8	84
7	Cardiology	1	4	88
8	Endocrinology	1	4	92
9	Histopathology	1	4	96
10	Medical Microbiology	1	4	100
	Total	25	100	-

A total of 98 (89.9%) out of 109 respondents gave the name of their hospitals or clinics. These 98 worked in 41 public

and private health institutions in Nigeria, spread across all six geo-political zones. About half (51%) of respondent doctors were based in institutions in the South West Zone and that a quarter (26.5%) were in the North Central Zone, these 2 zones thus accounting for 77.5%, or over three-quarters, of the 98 respondent doctors who gave the name of their institutions. Also, two-thirds of the 41 institutions were in just 2 Zones - North Central (14) and South West (13). The institution with the highest number of respondents was UCH, Ibadan (16.3%), and the 5 institutions with at least 5 respondents included: National Hospital Abuja (5), University of Abuja Teaching Hospital (6), Fed Med Centre, Ido Ekiti (6), LUTH (9) and UCH (16) (Table 2).

Table 2 Distribution by zone of health institutions of respondents

Zone	No. facilities	% facilities	No. doctors	% doctors
North Central	14	34.1	26	26.5
North East	1	2.4	1	1
North West	2	4.9	5	5.1
South East	1	2.4	1	1
South	5	12.2	9	9.2
South West	13	31.7	50	51
Zone unknown	5	12.2	6	6.1
Total	41	100	98	100

The level of care was known for 104 institutions, all levels of care in Nigeria being represented in the study sample. Table 3 shows that more than three-quarters (~77%) of the institutions were tertiary public facilities, while the remaining 23% were either primary or secondary or private institutions (all private institutions, irrespective of the level of care provided, were placed in the same category).

Table 3 Level of care

Level	Frequency	%	95% CI
1°	5	4.8	1.6 – 10.9
2°	9	8.7	4.0 – 15.8
3°	80	76.9	67.6 – 84.6
Private	10	9.6	4.7 – 17.0
Total	104	100	-

The study identified the use of four locations for routine and emergency laboratory tests. A total of 81 (75.7%) out of the 107 doctors who reported data on their laboratory service, used just one location for their laboratory tests. For 80% of these, a laboratory service was only provided in the local hospital lab. About 15% only used private labs close by, while 5%, only used a near-test facility (Table 4).

Table 4 Laboratories where lab tests were carried out: all respondents - Total = 107 (100%)

Location of lab	Freq (Yes)	%	95% CI
Local hospital lab	91	85	76.9 – 91.2
Private lab close by	25	23.4	15.7 – 32.5
Private lab distant	9	8.4	3.9 – 15.4
Near-patient test facility	17	15.9	9.5 – 24.5

Ideal waiting time according to respondents

When the respondents were asked about what the ideal turnaround was expected for patients in critical care situations, 91.3% of 104 respondents considered the ideal turnaround time for their laboratory results should be less than 2 hours, while 8.7% consider the ideal to be 2-4 hours.

Turnaround time according to respondents

From the turnaround times provided by the respondents, the mean turnaround times were calculated, the mean turnaround time for the laboratory results in the outpatients and emergency situation are shown in Figure 1. The fastest average turnaround time was 5.12 hours for the emergency room requests and the longest average turnaround time was 15.70 hours for the general medical outpatients.

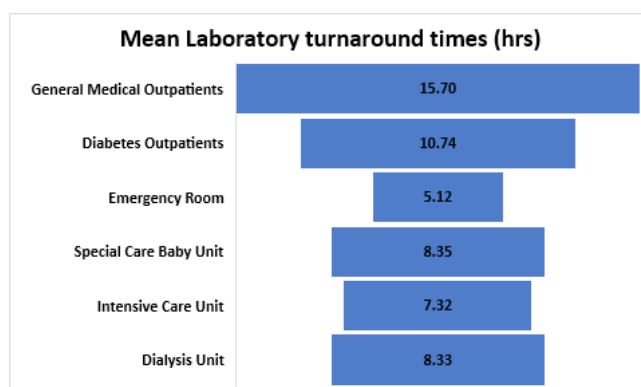


Figure 1 Mean turnaround time for laboratory results in outpatients and emergency situations

Table 5 Turnaround range time for lab results in emergency situations

Turnaround time (h)	Emergency Room %	Special Care Baby Unit %	Intensive Care Unit %	Dialysis Unit %
<2	47	20.4	23	14
2 – 4	19	22.2	30	19
4 – 8	17	25.9	17	33
8 – 12	6.2	9.3	7.5	11
12 – 24	8.6	16.7	21	19
>24	2.5	5.6	1.9	2.8
Total	100	100	100	100

In the emergency situations 47% of the respondents reported a turnaround time of less than 2 hours for tests requested from the emergency room compared to the 20.4%, 23% and 14% of the respondents who experienced a turnaround time of less than 2 hours for tests requested from other emergency situations like special care baby unit, intensive care unit and dialysis unit, respectively. Sixty-six percent (66%), 42.6%, 53% and 33% of the respondents experienced a turnaround time of less than 4 hours for tests requested from the emergency room, special care baby unit, and intensive care unit and dialysis unit, respectively. Eleven percent (11.1%), 22.3%, 22.9% and 21.8% of the respondents experienced a turnaround time of greater than 12 hours for tests requested from the emergency room, special care baby unit, and intensive care unit and dialysis unit, respectively (Table 5). The median range (hours) and modal range (hours) for: the emergency room was 2-4 and <2; the special care baby unit was 4-8 and 4-8; the intensive care unit was 2-4 and 2-4; the dialysis unit was 4-8 and 4-8.

Table 6 Turnaround range time for lab results in outpatient situations

Turnaround time (hours)	General Out Patients %	Diabetic Clinic %
<2	4.7	19
2 – 4	11.6	15
4 – 8	8.1	19
8 – 12	16.3	8.5
12 – 24	45.3	32
>24	14	6.4
Total	100	100

In the routine situations for the outpatient departments, 4.7% and 19%, of the respondents experienced a turnaround of less than 2 hours for tests requested from the general outpatients and diabetic clinics. About 16.5% and 34% of the respondents experienced a turnaround of less than 4 hours for tests requested from the general outpatients and diabetic clinics. Fifty-nine percent (59.3%) and 38.4% of the respondents experienced a turnaround of greater than 12 hours for tests requested from the general outpatients and diabetic clinics (see Table 6). The median range (hours) and modal range (hours) for: the general outpatient clinic was 12-24 and 12-24; the diabetic clinic was 4-8 and 12-24 hours.

DISCUSSION

Clinicians rely on the laboratory to provide them with the requested laboratory tests in a timely fashion. Therefore, the faster the results of the tests arrived at the attending clinician the earlier they are able to initiate and management

protocol in place for the patient. There are very few studies that have examined the laboratory turnaround times in both routine and emergency situations. The few studies available focus particularly on turnaround times in the emergency situations. In our study, we have examined the turnaround times in a number of situations covering emergency situations such as the emergency room, special care baby unit, intensive care unit and routine situations in the hospital in a developing country.

In our study, 91.3% of the respondents considered the ideal turnaround time for critical care situations in the hospital should be less than 2 hours, the remaining 8.7% thought at the extreme, it should be not more than 4 hours. It is generally accepted that the acceptable turnaround time is 1-2 hours [6,9]. The findings from this survey indicate that in the departments that require a quick turnaround time usually the emergency situations, the mean turnaround times ranged between 5.12 hours for the emergency room requests and 8.33 hours for the dialysis unit requests compared to the outpatient situations where the mean turnaround times ranged between 10.7 hours for the diabetic clinic and 15.7 hours for the general outpatient clinic were significantly lower. More interestingly, in the emergency situations the modal range times ranged between <2 hours for the emergency room requests and 4-8 hours for the dialysis unit requests compared to the outpatient modal range times of 12-24 hours for both the diabetic clinic and the general outpatient clinic. In blood tests taken in critical care situations such as the emergency room, special care baby unit and intensive care, it would be expected that the turnaround time should be much faster than that for routine tests and these results were consistent with findings from other studies [3,6-9,12]. A very surprising observation was that although 47% of the respondents experienced a turnaround time of less than 2 hours for tests requested from the emergency room, only about 20-30% of number of respondents who experienced a similar turnaround time in the other emergency situations such as special care baby, intensive care unit and dialysis unit. We believe that this could be better improved and probably can be explained by the low use of critical care point of care testing devices. In a previous study, we have showed that from the same respondents despite that 72% of those had access to a blood glucose meter, only 21%, 16.5%, of them had access to a point of care device for measuring coagulation markers or blood gases. Furthermore only 6% had access to a point of care device for cardiac enzymes [11].

The findings from this survey indicate that in the departments that do not require stat results usually the outpatient departments, fifty-nine percent (59.3%) and 38.4% of the respondents in this study experienced a turnaround time of greater than 12 hours for tests requested from the general outpatients and diabetic clinics. The median range (hrs) and model range (hours) for: the general outpatient clinic was 12-24 and 12-24; the diabetic clinic was 4-8 and 12-24 hours. These findings are quite consistent with findings from other studies on turnaround time in outpatient situation [6,7,9]. Another interesting observation was that 4.7% of the respondents experienced a turnaround time of <2 hours from the general outpatient clinic requests compared to higher number (19%) of the respondents who experienced a similar turnaround time for requests from the diabetic clinic. This might be due the nature of the patients that attend a general out patients which would generally consists of a mixture of surgical and medical patients, whilst the diabetic clinics would have only diabetics who are more prone to diabetic complications that would require very urgent tests requests such as blood glucose, urinalysis etc.

CONCLUSION

The reported laboratory turnaround time for outpatient departments in Nigeria is comparable to many countries in the world. The reported laboratory turnaround time for the critical care situations should or could be better. The increase in use of point of care testing into the emergency departments within the country should help to improve these turnaround times.

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