Tuberculosis Register Audit: a Comparison of TB Clinic, Niger Delta University Teaching Hospital and Tuberculosis and Leprosy Hospital, Bayelsa State, South-South, Nigeria.

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Abstract
Background: Good documentation and completeness in medical record is an important aspect in realizing patient safety and implementation of healthcare services. In order to ensure that Tuberculosis data generated in health facilities are of high quality, there is a need for routine monitoring and periodic audit. However, there is dearth of research work that audited the quality of Tuberculosis data generated in health facilities in South South, Nigeria. Therefore this study is aimed at carrying out audit and comparing Tuberculosis data generated in two health facilities in Bayelsa State, South South, Nigeria.

Methods: This was a health institutions-based retrospective study on the audit of Tuberculosis patients data generated in the Niger Delta University Teaching Hospital and the Tuberculosis and Leprosy Referral Hospital between January, 2016-December, 2019.
The information for the study was collected from the Tuberculosis suspects and laboratory registers. Data were analyzed with Statistical Programme for Social Sciences version 20 (SPSS) software. The level of significance was set at P<0.05.

Results: A total of 1369 patients,601 patients from the Niger Delta University Teaching Hospital and 768 patients from the Tuberculosis and Leprosy Referral Hospital had their data audited. The Tuberculosis data was more complete in the Niger Delta University Teaching Hospital than the Tuberculosis and Leprosy Referral Hospital notably for gender (98.5 % vs 94.4%; p<0.001, age (98.5% vs 97.3%;p<0.12) and HIV status(98.6% vs 96.5% ; p<0.71) but the Tuberculosis and Leprosy Referral Hospital had more complete Gene Xpert data (98.3% vs 94.3%;p< 0.001).

Conclusion: The Tuberculosis data generated in the two healthcare institutions was incomplete. The finding of this Tuberculosis data audit highlights the need for best practice to be adopted to ensure quality healthcare data.

KEYWORDS: TB data, Auditing, Niger Delta Teaching Hospital, TB and Leprosy Referral Hospital

Introduction

Tuberculosis (TB) is a major public health issue worldwide with an estimated global incidence of 10.0 million (range, 9.0–11.1 million) in 2018.[1] Nigeria was among eight high burden countries that accounted for two thirds of the global total and was responsible for 4% of the global TB burden in 2018[1].In Nigeria the estimated total incidence of TB in 2018 was 429,000 and the total TB case notifications was 103,921.[2]

Despite increases in TB notifications, there is still a large gap between the number of new cases reported (7.0 million) and the estimated 10.0 million incident cases in 2018. In 2018, 7 million people were detected and notified and 3 million people with TB were undiagnosed or detected and not reported[1]. This gap is due to a combination of underreporting of detected cases and under-diagnosis[1].

Incomplete and poor quality of medical records of TB cases reported in health facilities and surveys in developing countries could account for incongruence between the number of new cases reported and the estimated incident cases.[3]The incompleteness of medical records is a significant problem that affects the quality of health care services in many hospitals.

The poor state of health information systems in many countries is widely documented in the literature and in country reports to the World Health Organization (WHO).[4]Improving the completeness of patient's records is an important step towards improving the quality of healthcare. Medical record completeness is a key performance indicator that is related with delivery of healthcare services in the hospital.[5]

Good documentation in medical record is an important aspect in realizing patient safety. The completeness of medical records is very important in the implementation of health services, especially to improve the quality of patient care and safety.[6]

Health Statistics in TB programme provide information for understanding, monitoring, improving and planning the use of resources to improve the lives of people, provide services and promote their well-being. Statistics obtained from proper recording and reporting of TB data will assist health policy makers and health workers to plan for effective and efficient healthcare delivery system to curb the menace of this curable and preventable infectious disease. In order to ensure that TB data generated in health facilities are of high quality, there is a need for routine monitoring and periodic audit.

However, there is dearth of research work on the quality of TB data generated in health facilities in South South, Nigeria. Therefore this study is aimed at carrying out audit and comparing TB data generated in two health facilities in Bayelsa State , South South, Nigeria where TB services are rendered to patients.

Materials and Methods

This was a health institutions-based retrospective study of TB patients data generated in the Niger Delta University

Teaching Hospital and the Tuberculosis and Leprosy Referral Hospital between January, 2016-December, 2019. The two health facilities are all located in Bayelsa State, South South, Nigeria. The study followed the guidelines on programmatic management of tuberculosis in Nigeria.[7]

The Niger Delta University Teaching Hospital is currently the only Bayelsa Government state-owned tertiary hospital with core mandates of providing tertiary healthcare services, training of all cadres of healthcare professionals and conducting research.

This hospital has a functional respiratory unit rendering TB DOT services to patients. It is located in Okolobiri at the outskirt of Yenagoa, the state capital. The tuberculosis and leprosy DOTS centre, Igbogene, serves as a referral hospital to tuberculosis patients.

It is located in the heart of the state capital. Most of the served communities are surrounded by water and inaccessible by road. Bayelsa State is one of the 36 states in Nigeria, West Africa. It is geographically located within Latitude 04 to 15' North, 05 to 23' South and longitude 05 to 22' West and 06 to 45' East. It shares boundaries with Delta State on the North, Rivers State on the East and the Atlantic Ocean on the West and South. Bayelsa State is a picturesque tropical rain forest, with an area of about 21,110 square kilometres. More than three quarters of this area is covered by water, with a moderately low land.

The instrument that was used for the study was a specially designed form for data collection. The information for the study was collected from the tuberculosis TB suspect and TB laboratory registers. The information obtained from the TB suspect and laboratory registers included demographic data, gene expert and HIV test results.

Interview of staff in-charge of the TB programs in both institutions was done to assess personnel audit, staff mix, training and capacity building, funding of the TB programs, frequency of performance review meetings and incentives given to the staff.

The total number of patients with complete record in each variable was divided by the total number of persons in the TB suspect registers during the study period to yield a proportion for completeness of records for each data source. For each variable of interest, the proportion of records with a non-missing value recorded was calculated, and the chi-square statistic was used to compare proportions across the two data sources.

Data were analyzed with Statistical Programme for Social Sciences version 20 (SPSS) software. Frequency tables, ratio, proportions and rates were used to review data. The Chi-square test was used to compare categorical variables. The level of significance was set at $P<0.05$.

Ethical clearance was obtained from the appropriate authority.

Results

During the study period 601 patients from the Niger Delta University Teaching Hospital and 768 patients from the TB and Leprosy Referral Hospital with suspected TB disease giving a total of 1369 patientshad their TB data audited.

The TB data was more complete in the Niger Delta University Teaching Hospital TB suspect and laboratory Registers than the TB and Leprosy Referral Hospital TB suspect and TB laboratory registers notably

for gender (98.5 % vs 94.4%; p<0.001)age (98.5% vs 97.3%; $p=0.12$ and HIV status(98.6% vs 96.5% ; p=0.72). Completeness also varied for Gene Xpert data but the TB and Leprosy Referral Hospital had more complete data than the Niger Delta University Teaching Hospital (98,3% vs 94.3%;*p*<0.001).

In the Niger Delta University Teaching Hospital 530 (88..2%) of all persons with presumptive TB recorded in the TB Suspect and laboratory Registers contained complete Age, Sex, HIV status and Gene Expert data. (Table 1 below).

Table 1: Distribution of the TB patients at NDUTH based on gender, age, HIV Status, Gene Xpert results and missing values.

Clinical Characteristics of Patients	Frequency N=601(%)	
Gender:		
Male	321	(53.4)
Female	271	(45.1)
Missing	9	(1.5)
Age range		
<12 months	2	(0.3)
1 - 5years	12	(2.0)
6 - 17years	40	(6.6)
18 - 44 years	361	(60.1)
45 - 64 years	134	(22.3)
65 years and above	43	(7.2)
Missing	9	(1.5)
HIV Status:		
Positive	324	(53.9)
Negative	258	(42.9)
Missing	19	(3.2)
MTB detected:		
Yes	117	(19.5)
No	450	(74.9)
Missing	34	(5.6)
Total	**601**	**(100)**

MTB-Mycobacteria tuberculosis

In the TB and Leprosy Referral Hospital 664 (86.5%) of all patientswith presumptive TB recorded on the TB Suspect and laboratory Registers contained complete Age, Sex , HIV status and Gene Expert data (table 2 below).

Table 2: **Distribution of the TB patients at the TB and Leprosy Referral Hospital based on gender, age, HIV Status, gene xpert results and missing values.**

Clinical Characteristics of Patients Frequency N= 768(%)

Gender:	
Male	427(55.6)
Female	298 (38.8)
Missing	43 (5.6)
Age range:	
<12months	-
1-5years2(0.3)	
6-17years49(6.4)	
18-44years523(68.1)	
45-64years151(19.6)	
65years22(2.9)	
Missing21(2.7)	
HIV Status:	
Positive291(37.9)	
Negative450(58.6)	
Missing27(3.5)	
MTB detected:	
Yes121(15.8)	
No634(82.5)	
Missing13 (1.7)	
Total	768 (100)

MTB-Mycobacteria tuberculosis

TB data on gender was more complete in the Niger Delta University Teaching Hospital TB suspect and laboratory Registers than the TB and Leprosy Referral Hospital TB suspect and TB laboratory registers (98.5 % vs 97.0%) but the difference was not statistically significant(p=0.68), (table 3 below) .

Table 3:The table below shows the comparison of the gender distribution of the TB Suspects and the missing values in the two institutions.

Gender	Male	Female	Missing	Total
Hospital				
NDUTH	321(53.4%)	271(45.1%)	9 (1.5%)	601 (100%)
TB Leprosy Hospital	427 (55.6%))	298 (38.8%)	43 (5.6%)	768 (100%)
Total	748	569	52	1369(100)

Result: χ^2 = 15.5; p<0.001. The difference was statistically significant**.**

TB data on age was more complete in the Niger Delta University Teaching Hospital TB suspect and laboratory Registers compared to the TB and Leprosy Referral Hospital TB suspect and TB laboratory registers (98.5 % vs 97.0%) but the difference was not statistically significant(p=0.68) table 4 below.

Table 4: Comparing the age distribution of the TB patients and the missing values in the two institutions

Age	< 12months	1 - 5years	6 - 17years	18 - 44 years	45 - 64years	≥ 65years	Total	missing	sum total
Hospital									
NDUTH	2(0.3%)	12(2.0%)	40(6.6%)	361(60.1%)	134(22.3%)	43(7.2%)	592	9(1.5%)	601
TB/Leprosy Hospital	Nil	2(0.3%)	49(6.4%)	523(68.1%)	151(19.6%)	22(2.9%)	747	21 (2.7%)	768
Total	2	14	89	884	285	65	1339	30	1369

Result: x^2 =2.4065, p-value <0.12. There was no significant association.

Niger Delta University Teaching Hospital TB suspect and laboratory Registers had more complete data on HIV status compared to the TB and Leprosy Referral Hospital (96.8% vs 96.5%). The difference was not statistically significant p=0.72, as shown in table 5 below.

Table 5: Comparison of the distribution of HIV status of the TB patients and the missing values in the two institutions.

HIV Status	Positive	Negative	Missing	Total
Hospital NDUTH	324 (53.9%)	258 (42.9%)	19 (3.2%)	601
TB/ Leprosy Hospital	291 (37.9%)	450 (58.6%)	27 (3.5%)	768
Total	615	708	46	1369

Result: χ^2 = 0.1303; p=0.72.The difference was not statistically significant at p<0.05

Table 6: Comparison of the distribution of gene xpert results of the TB patients and the missing values in the two institutions

MTB detected	Yes	No	Missing	Total
Hospital NDUTH	117 (19.5%)	450 (74.9%)	34 (5.6%)	601
TB/Leprosy Hospital	121 (15.8%)	634 (82.5%)	13(1.7%)	768
Total	238	1084	47	1369

Result: χ^2 = 15.9843, P<0.001.The difference was statistically significant at p<0.05.

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Discussion

Audit of medical records to determine clerical deficiencies could be useful in discovering gross and easily discernible medical errors. Some studies[8-9] showed that medical records quality reflects healthcare quality provided by physicians, and an efficient medical record system facilitates medical care assessment and research.

The current study revealed that TB data generated in the two health facilities, the Niger Delta University Teaching Hospital and the Tuberculosis and Leprosy Referral Hospital during the study period was incomplete.

The overall completeness of TB patients' medical records on the TB suspect and laboratory registers in the Niger Delta University Teaching Hospital and the Tuberculosis and Leprosy Referral Hospital was 88.2% and 86.5% respectively. Some of the data concerning the patients' demography, HIV status and Gene Expert results were not captured or missing in the medical records of the patients across the two institutions.

This finding is in contrast with a study done in Ethiopia which showed a medical record completeness of 73% before intervention and 84% after intervention.[10]
Another study done in a rural hospital in Ethiopia showed that only 45.7% of medical records were complete.[11] However, the findings of this study is similar to that of a study done by National Tuberculosis Control Program, Ministry of Health and Child Care Zimbabwe (2011-2013).[12]

The incomplete data identified in the current study may be due to data entry clerical errors or lack of expertise and experience amongst the categories of Health Workers responsible for entering TB patients' data on the TB suspect and laboratory registers in the two health facilities.

In this study, the Niger Delta University Teaching Hospital TB suspect and Laboratory registers had more complete data than the TB and Leprosy Referral Hospital. This is rather not surprising as the TB facility at the Niger Delta University Teaching Hospital being a tertiary health institution is expected to have a more meticulous data entry on the TB suspects and Laboratory registers than the TB referral hospital. This expected findings could be due to the differences in the health staff mix responsible for rendering TB services and supervision in the two institutions.

In the Niger Delta University Teaching Hospital, qualified and experienced medical doctors, laboratory scientists, health information management and nurse staff were responsible for the documentation and supervision of data entry on the TB suspect and laboratory registers. On the other hand, this documentation was carried out by laboratory scientists, health information management personnel, community health officers and some adhoc staff in the Tuberculosis and Leprosy Referral Hospital.

Another plausible reason is the existence of a quality improvement committee in the Niger Delta University Teaching Hospital saddled with the responsibility to enhance quality of healthcare services including quality medical data documentation in all departments.
However, the TB and Leprosy Referral Hospital had more complete Gene Xpert data than the Niger Delta University Teaching Hospital. This unexpected

findings could be due to interruption of Gene Xpert services for some months during the study period in the Niger Delta University Teaching Hospital following a technical fault that developed in the Gene Xpert machine. Consequently, samples for Gene Xpert test were taken to other health facilities to carry out during the period which could have had a negative impact on proper documentation of the Gene Xpert test results.

Supportive supervision and performance review meetings are organized by the TB Program for staff involved in the TB control program. In performance review meetings many health workers from various levels of health care and key stakeholders come together at a central venue for follow-up training, monitor and provides feedback about TB program medical record keeping and reporting.

Performance review meetings like support supervision are a data-driven process of discussing, guiding, and training of health workers to ensure and improve their competence, effectiveness and efficiency.

Performance review meetings and other trainings are usually organized by the TB control program coordinators and international partners and were held frequently in a year. However, because of the need to cut cost these performance review meetings and trainings could not be held frequently. This could have impacted negatively on the quality of TB data generated by the two healthcare institutions.

It is worth noting that the findings in this study are not intended to be used for making generalizations, but underscore the usefulness of routine auditing of medical data generated in health institutions.

The study had a limitation, which is worth noting. This audit purposefully focused only on the data entered on the TB suspect and Laboratory registers in the two institutions and therefore, its generalizability to other TB registers, settings and locations may not be directly applicable

Conclusions

The TB data generated in the two healthcare institutions, the Niger Delta University Teaching Hospital and the TB and Leprosy Referral Hospital was incomplete. The finding of this TB data audit in the two healthcare institutions highlights the need for best practice to be adopted to ensure quality healthcare data.

Recommendations

All necessary steps should be taken to improve on the integrity of TB data generated in health facilities.
We recommend periodic audit of medical records in all health facilities to identify deficiencies in hospital statistics.

Health authorities should carry out routine checks on medical records to ensure that data generated in the hospitals are of good quality. Intensive and continuous training should be given to the healthcare providers by responsible body.

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