CHALLENGES OF HAEMATOLOGY PRACTICE IN AFRICA DURING COVID-19 PANDEMIC

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BACKGROUND OF COVID-19 INCLUDING THE CURRENT STATE OF THE PANDEMIC IN NIGERIA

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection has now been reported in all African countries, although, the time of incident cases varied from one country to the other. Whereas Egypt reported the incident case on February 14th, 2020, the first case in Nigeria was reported on February 27th, 2020 and no case in Lesotho until May 13th, 2020. Although the pandemic has not been as severe as in Europe, America and Latin America where deaths have occurred in thousands, the number of cases in most African countries is still rising, plateau is yet to be reached and the curve is not bending as reflected in Figure 1 showing the Nigerian pandemic. In Nigeria, only 115,760 tests have been done as of June 21st, 2020 with a total of 20,244 positive cases with a positivity rate of 17.8% (https://covid19.ncdc.gov.ng/report/)

The pandemic has socio-political and economic effects, and these are widely discussed in both regular and social media on a daily basis. However, the deleterious effects of this pandemic on medical practice generally, and haematological practice, in particular, is the focus of this paper. In response to the pandemic, the requirement for social distancing that necessitated lockdown all over the world resulted in a situation where people with chronic diseases are not able to access care for close to 8 weeks and more, depending on the country. Such chronic conditions include hypertension, diabetes, chronic kidney disease, chronic liver disease, chronic respiratory disease including asthma, atopy and patients with immunocompromised condition such as HIV and those living with benign and malignant conditions. There was also general

panic among healthcare providers who were not front liners against COVID-19 and most clinics and departments were shut down in most hospitals.

In this paper, we reviewed the effect of the COVID-19 pandemic on haematological practice with respect to; i) patients attendance in the clinic, ii) our ability to provide haematological laboratory services while observing standard safety precautions to avoid or limit the risk of infection of laboratory staff, iii) provision of clinical care for patients with haematological disorders including haemostatic disorders, anaemia and haemato-oncological conditions and iv) observing universal safety precautions and COVID-19 specific precaution between the doctors and patients. We also reviewed the effect of SARS-CoV-2 in the management of those infected who have oncologic comorbidity and v) the effect of this pandemic on training and research.

THE EFFECT ON PATIENT CLINIC ATTENDANCE

For variable period of time,and depending on the duration of lockdown in most African countries, patients with haematological condition just like patients with other medical conditions were not able to access care, as there was a complete shutdown of all outpatient clinic including the haematology clinic. During this period, patients who are transfusion dependent, particularly, those with bone marrow failure syndromes, as well as patients who are on scheduled chemotherapy had difficulties accessing care. Some lessons were learnt in most clinic. The most important of these lessons is that every patient irrespective of medical illness should be considered COVID-19 infected. The patients should also consider the healthcare workers that will provide care as potentially COVID-19 infected. Both are expected to protect each other through the observance of COVID-19 infection and prevention control (IPC) protocol. At the minimum, the patient and the attending haematologist should wear medical face masks, which has been shown in recent study to be as effective as the N-95 mask in the prevention of infection by SAR-CoV-2 (1). This is key, as the most important portal of entry of SARS-COV-2 virus is via the respiratory tracts (nose and mouth). Transmission via the sclera particularly if there is opthalmitis or eye irritation is equally common and, as such, routine clinic IPC should include wearing of face shield and goggles. Another important lesson learnt is the need for provision of pedal operated tap to provide water for regular hand washing. These are currently being fixed in several outpatient clinics. The period of lockdown also taught us the importance of teleconsultation. Some of the patients who had access to telephone lines of the doctors were able to arrange virtual meetings via different platforms, namely: Google meet, Zoom and Skype. During the post COVID period, this is likely to become the new norm.

The use of “medical dispatch rider for health” to deliver critical medication to patients at home was also adopted during this time and might also become the new norm going forward. It is worthy of note that despite the level 4/5 lockdown, very ill patients were allowed by enforcement agents to attend skeletal clinical services that were being provided at the day care center. The data from the Lagos University Teaching Hospital (LUTH) as in Figure 2, did not show a significant increase in attendance at the day care center where services as shown in Table 1 were provided. In contrast, it became more active than usual with the risk for loss of requirement of social distancing. Post COVID-19 infection, the need for ensuring social distancing at the reception hall of the clinics and other clinical service areas must become a new norm and this could be achieved through a staggered appointment for clinic attendance.

THE EFFECT ON LABORATORY SERVICES

The laboratory staff missed the great opportunity to process and evaluate biological samples from SARS-CoV-2 infected patients for reporting purposes. This was because whole blood separation using centrifugation generates aerosol. It was opined that the laboratory environment can be contaminated with centrifugation generated aerosols. It was also believed though erroneously that the blood or blood product do carry viable COVID-19 particles. Experiences from the Netherlands and Brazil had shown that there are asymptomatic blood donors whose sera tested IgG and IgM anti-COVID antibody positive and a few with COVID-19 RNA particles (2,3). Transfusion of such blood in South Korea was shown not to cause COVID-19 infection in the recipient of such products with Covid 19 RNA in plasma (4). Ragan et al., are of the opinion that transfusion practice should be made safer by subjecting blood from asymptomatic COVID-19 antibody positive donor to pathogen reduction procedure such as riboflavin with ultraviolet light treatment (5). Although, it is too early to generalize conclusions, we can prevent laboratory transmission of the virus from blood and blood product by the observance of routine standard safety precautions. Data from LUTH showed that the workload at haematological laboreatories (routine, coagulation, special stain and transfusion transmissible infections screening lab) all sharply declined. Routine samples were not received during the period of fear and uncertainty except if the patient has been certified to be SARS-CoV-2 negative. With better understanding of COVID-19 pathology, we are looking forward to better routine haematology contribution to the understanding of haematology of COVID-19, particularly the Full Blood Count and the morphology of all cellular component of the blood at different phases of SARS-CoV-2 infection.

THE EFFECT ON HAEMATO-ONCOLOGY

SARS-CoV-2 infection is generally more severe in patients with co-morbidities, particularly malignancies. Incidentally, many patients with haematological malignancies have not been diagnosed with COVID-19. Of the 356 patients with COVID-19 admitted so far at LUTH, only 7 were patients with malignancies as co-morbidity. The management of these cases was not influenced by SARS-CoV-2 co-morbidity. Table 2 shows the outcome of COVID infection in these patients. These lethal outcomes are not unexpected given the depressed immune status imposed by cancer cells as well as the immunosuppression by chemotherapy. Currently, we are exploring differences in immune responses in patients with haemato-oncology conditions with Covid 19 comorbidity as compared with responses in patients with only COVID 19 infection.

THE EFFECT ON TRANSFUSION MEDICINE PRACTICE

Transfusion medicine suffered as donor population fell by 50% as shown in Figure 3 and yet transfusion requirement during the lockdown period did not reduce proportionately. Unlike elsewhere, where opportunity was seized to determine the prevalence of IgG and IgM antibodies in apparently healthy donors, the scare of laboratory transmission prevented the blood group serology laboratory scientists in most African countries from working on the limited number of donors that were available during the lockdown period. The confidence that is currently building with respect to the emerging reports of reduced laboratory risk of transmission of the virus is beginning to reverse the situation. As discussed earlier, asymptomatic blood donors with COVID 19 infection have been bled in many countries. Many were only detected to be COVID antibody positive after blood donation. In some instances, the blood or its products have been transfused before the detection of COVID antibodies (4,5). More worrisome is the demonstration of COVID-19 RNA sequences in the sera of some of the donor. It is pertinent to state however that the presence of RNA does not translate to infectivity of the virus as the detection of COVID RNA particles is not equivalent to the presence of the virion particles. Patients who have received blood products positive for COVID-19 RNA have not been proven to become infected with COVID-19 as demonstrated in South Korea (4). These reports although should be reassuring to African blood transfusion medicine practitioners, the need to make transfusion of blood and blood products safer still exists. The AABB and many other authorities have stated that products positive for COVID-19 IgG and IgM antibody may

still be used but must be made safer by pathogen reduction mechanisms.

http://www.aabb.org/advocacy/regulatorygovernment/Documents/AABB-Regulatory-Updates-for-COVID-19.pdf

THE IMPACT ON TRAINING

Many institutions in Africa lack internal funding to support research, as well as support for training to equip young faculty with the necessary skills to undertake responsible conduct of research. Research endeavors are most likely supported by external grants particularly NIH/FIC. As at May 2020, NIH/FIC supports 360 research grants in Africa; Of these, 93 are training grants. Nigeria has a total of 29 grants and 11 training grants inclusive (https://www.fic.nih.gov/Grants/search/Pages/search-grants.aspx). The major impact of COVID-19 on these grants, particularly the training grants is the restriction of movement that prevents young Scientists in Africa to travel to mentor institutions in the United States and other developed countries to complete in-person course work or to attend workshops for skill acquisitions that is a prerequisite for laboratory work. There is also a restriction that impacts negatively on program components that requires US/UK faculty to travel to African countries to facilitate local workshop and lectures. Although, it is believed that most of these mentorships expected from foreign faculties in African institutions can be undertaken through innovative solutions such as virtual learning and telemedicine. However, critical hands on training (bench work) may not be possible to replicate in an online platform. In particular, hands on training in genomics which is offered in many D43 programs in Nigeria by our foreign collaborators including Harvard, Northwestern and Emory universities are practically impossible to be offered online.

CONCLUSION

SARS-CoV-2 infection is still rising in most African countries, particularly, Nigeria. There is so much fear among healthcare providers, as well as patients population reflecting in decrease clinic attendance of patients who do not have COVID-19 infection. Laboratory staff need to observe universal safety precaution and be able to handle biological materials from SARS-CoV-2 infected persons so that we can contribute to our understanding of haematological changes that occur in these patients. Training is adversely affected, however, new norms as regards telemedicine and virtual lab training may be a good byproduct of this pandemic.

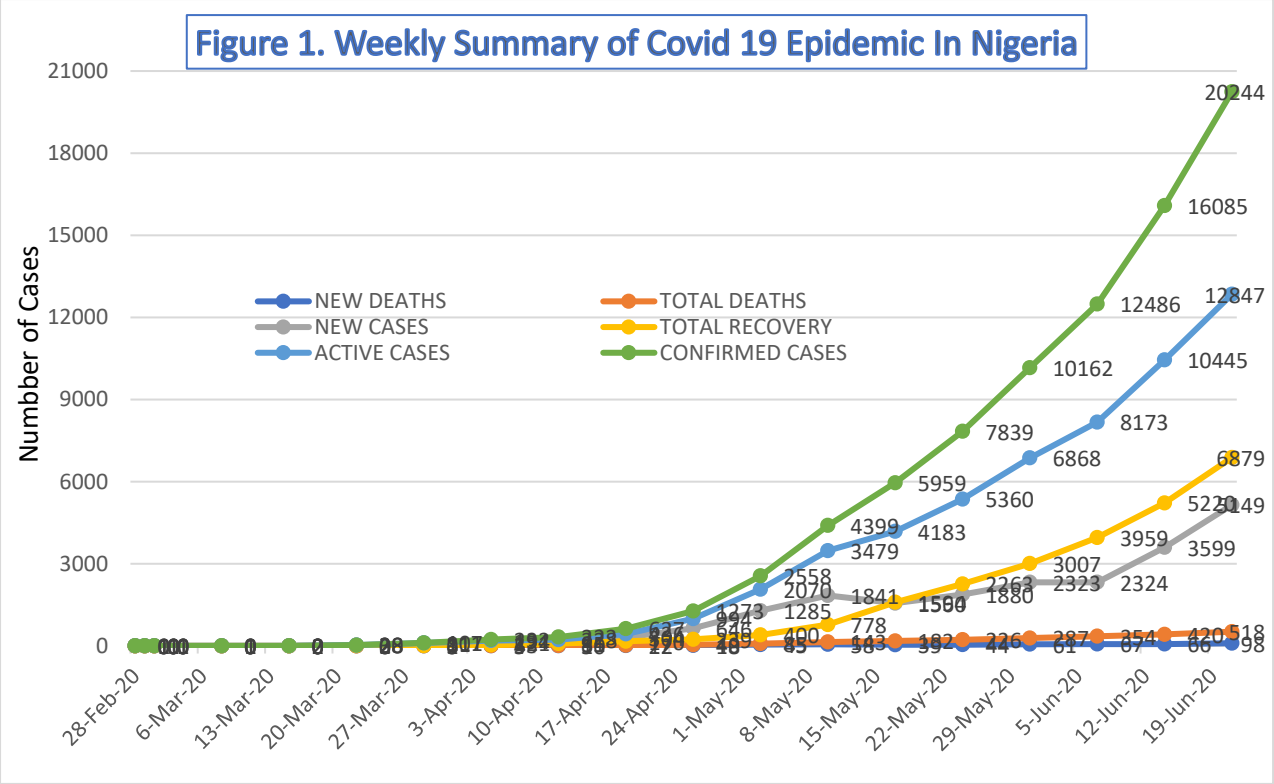
Figure 1. Weekly Summary of Covid 19 Epidemic In Nigeria
Numbber of Cases
NEW DEATHS
NEW CASES
ACTIVE CASES
TOTAL DEATHS
TOTAL RECOVERY
CONFIRMED CASES
28-Feb-20
6-Mar-20
13-Mar-20
20-Mar-20
27-Mar-20
3-Apr-20
10-Apr-20
17-Apr-20
24-Apr-20
1-May-20
8-May-20
15-May-20
22-May-20
29-May-20
5-Jun-20
12-Jun-20
19-Jun-20

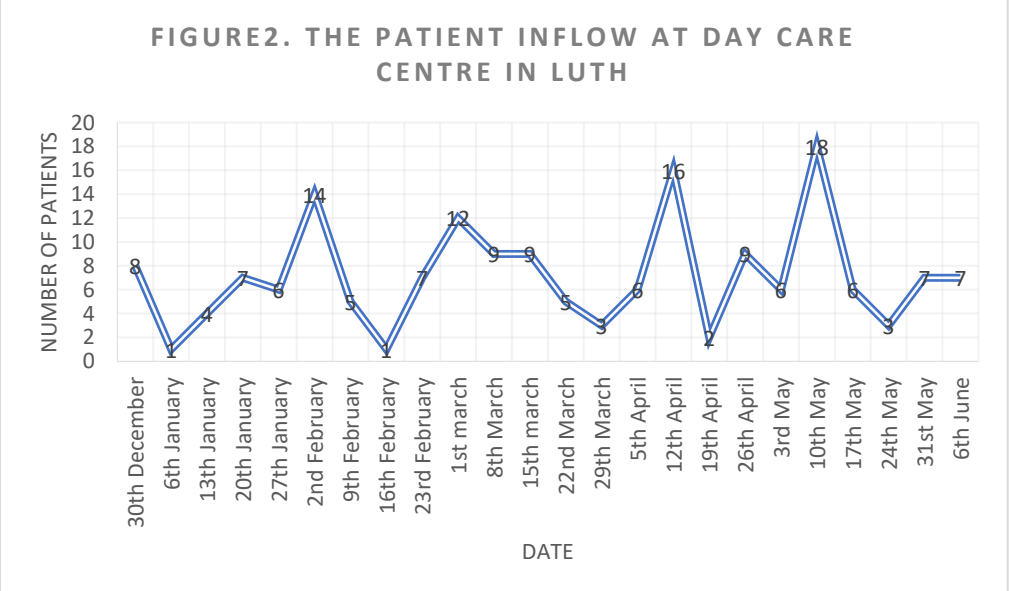
FIGURE2. THE PATIENT INFLOW AT DAY CARE CENTRE IN LUTH
NUMBER OF PATIENTS
DATE
30th December
6th January
13th January
20th January
27th January
2nd February
9th February
16th February
23rd February
1st march
8th March
15th march
22nd March
29th March
5th April
12th April
19th April
26th April
3rd May
10th May
17th May
24th May
31st May
6th June

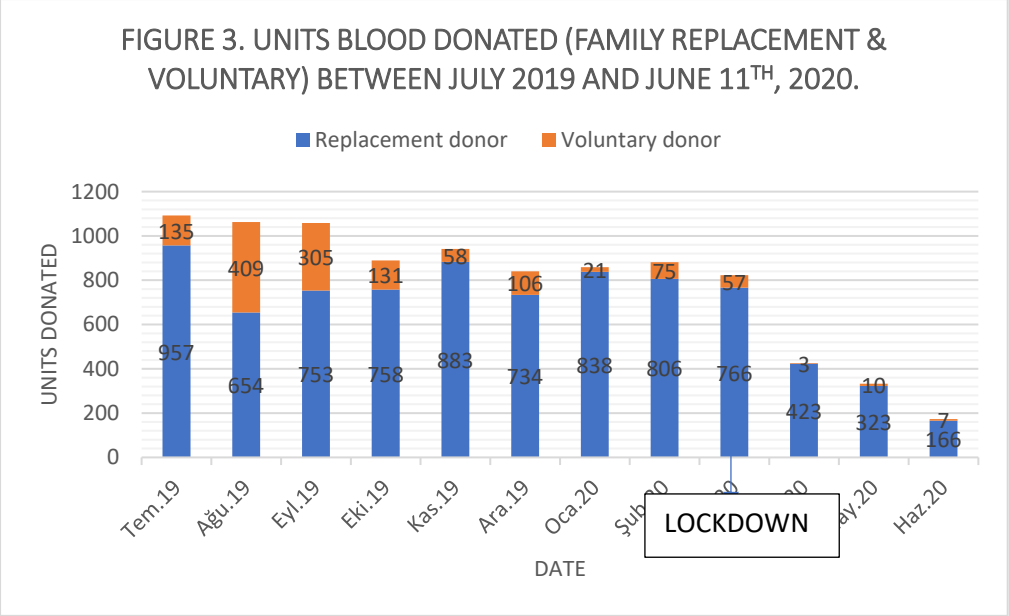

TABLE 1: CASES MANAGED AT THE HAEMATOLOGY DAYCARE CLINIC IN LUTH DURING COVID-19 LOCK DOWN PERIOD

S/N	CASES MANAGED	PROCEDURES DONE
1	Multiple Myeloma	• Chemotherapy administration • Blood Transfusion • Venesection • Bone marrow aspiration and Biopsy • Observation and Treatment of Crises in Sickle Cell Disease • SC administration of Erythropoietin and G-CSF
2	Hodgkin's lymphoma	
3	Sickle cell anaemia (Vasoocclusive crises, Haemolytic crises)	
4	Adult Acute Lymphoblastic Leukaemia	
5	Polycythaemia rubra vera	
6	Non hodgkins lymphoma	
7	Aplastic anaemia	
8	Deep venous thrombosis	
9	Chronic Myeloid Leukaemia	
10	Chronic myelomonocytic leukaemia	
11	Bleeding disorders	

TABLE 2: THE OUTCOME OF COVID-19 INFECTION IN PATIENTS WITH MALIGNANCIES IN LUTH

S/N	INITIALS	DIAGNOSIS	CLINICAL HISTORY	STATUS
1	O.O	Acute Myeloid Leaukemia	53, female, admitted through A & E, poor, lethargic, diagnosis was made on peripheral blood film.	Dead
2	E.G	Bone Lymphoma	37, female, investigated for transfusion dependent anaemia. BMA revealed likely bone lymphoma. Presented with fever, breathlessness, cough. Recommenced on steroids on admission when PCV dropped. PCV now about 30%.	Discharged
3	E.V	Extraobital Malignancy	50-year-old female.	Dead
4		Cancer of Prostrate	Presented with acute urinary retention.	Dead
5	O.P	Bladder Cancer	Has had chemo and radiotherapy for bladder cancer. Presented with fever, cough, breathlessness and haematuria	Dead
6	O.	PRV Polycythaemia Rubera Vera	Had been receiving analgleride for 5 years PRV.	Discharged
7		Lung Cancer		Dead

REFERENCES

1. Bartoszko JJ, Farooqi MAM, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials. Influenza and other Respiratory Viruses. 2020;(April):365–73.

2. Erikstrup C, Hother CE, Pedersen OBV, Mølbak K, Skov RL, Holm DK, et al. Estimation of SARS-CoV-2 infection fatality rate by real-time antibody screening of blood donors. medRxiv [Internet]. 2020;2020.04.24.20075291-Preprint. Available from: http://medrxiv.org/content/early/2020/04/28/2020.04.24.20075291.abstract

3. Chang L, Yan Y, Wang L. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information . 2020;(January).

4. Kwon SY, Kim EJ, Jung YS, Jang JS, Cho NS. Post-donation COVID-19 identification in blood donors. Vox Sanguinis. 2020;1–2.

5. Ragan I, Hartson L, Pidcoke H, Bowen R, Goodrich R. Pathogen reduction of SARS-CoV-2 virus in plasma and whole blood using riboflavin and UV light. PloS one. 2020;15(5):e0233947.