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COVID-19 Superheroes

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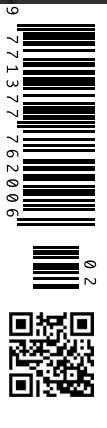
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Traversing the Unknown Frontlines - COVID-19 from a Resource Limited East African Setting

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The purpose of this article is to provide frontline clinical and operational experiences in East Africa in the management of the COVID-19 storm – specifically within the dialysis setting – leading to best-in-class patient outcomes.

Key Points

- Introduction to COVID-19 globally and locally.
- Effective means of rapid response, organisational planning and preparing for the unknown.
- Leveraging the “infodemic” and the frontline experiences to map out a plan.
- Managing COVID-19 internally and externally – learning and innovating to achieve best outcomes.
- Prophylaxis in the absence of vaccines and anti-virals.
- Rinse repeat – plan, do, study, act (PDSA) – creating a culture of continuous improvement.

As the impact of the COVID-19 pandemic swept across the Middle East, Europe and the United States, Africa reported its first case on February 15, 2020 from Egypt. By April, Africa had 1,000 cases and 500 deaths but the media reports of the West had caused the predicted turmoil. The threat COVID-19 was thought to have exacerbated the impact in Africa and not any less in East Africa. Soon inward international flights stopped, and East Africa made quarantine mandatory for arrivals, both national and foreigners, with travelers needing quarantine. Large public gatherings, community meetings, rallies, sports, and entertainment were banned with the schools and universities being already shut.

Rapid Response, Organisational Planning and Preparing for the Unknown Unknown

The need of the hour for our organisation, Africa Healthcare Network (AHN), was a rapid response plan to be implemented within our haemodialysis centres across the region. Top priority was fast-tracking life-saving efforts, quick roll-out responses, and recovery strategies on the ground for our patients. Our team needed to prepare, expedite and facilitate urgent support of our haemodialysis patients both affected by COVID-19 and those at risk across East Africa. As fear, insecurity, and feelings of fragility due to the pandemic had filled our haemodialysis populations, all efforts and initiatives were aligned under the leadership team, most critically, with the priorities of the health of our

patients being kept in mind. The COVID-19 response was taken to the highest level of the organisation and coordinated into all the dialysis units. The entire coordination of operations, communications and implementation supervision was run from a common point within the organisation with all the staff standing together. The corporate and frontline's existing knowledge in infectious disease control, surveillance system and repurposing of facilities for screening, isolation and management of COVID-19 were capitalised in the rapid response preparedness.

The overall focus of this rapid response was three pronged:

- Strategies to prepare for and help prevent the spread of the virus within the units.
- Ongoing support to respond during the outbreak.
- Ensuring continued availability of resources to help patients recover from the disease and preventing morbidity and mortality among those haemodialysis patients affected.

were already capacitated to provide critical care with the existing nursing staff and physicians trained in advance. New patients being dialysed elsewhere were triaged for assessment and investigation before initiation into COVID-19 specific dialysis units or need for admission is decided. And our centres were the only ones to care for COVID-19 positive renal patients at the start of the disease prevalence. Detailed contact and communication systems were laid out with names of responsible individuals outlined. Independent, daily data collection and reporting systems of new or old, suspect or proven positive COVID-19 were set up.

All the frontline nursing staff were quickly trained in implementing the COVID-19 AHN guidelines, to make an effective frontline for the COVID-19 battle. Systems were put in place for patient education where needed and training of the nursing teams to screen and triage patients and staff, managing isolation dialysis and understanding management and treatment protocols. Proper and meaningful use of the scarce personal

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Leveraging the “Infodemic” and the Frontline Experiences to Map out a Plan

The first actions were to understand the unknown unknown of the pandemic with advice from experts across the globe. Our organisation circled the wagons, tapping into individual networks to gather experiences and guidelines from leading institutions such as the CDC, international dialysis chains, national guidelines, along with individual team inputs to prepare a common guideline document, with modifications for local reality.

The facilities of Dar es salaam, Tanzania were first identified high risk for potential early COVID-19 positive patients. Mwanza and Arusha were next prepared to isolate and treat suspects and positives. Much later the centres of Kigali, Gihundwe and Gisenyi at Rwanda. Isolation areas or complete units were identified specifically for dialysis of suspect and infected COVID-19 patient clusters. Specific dialysis nurses from the team within each unit were identified to form COVID-19 teams and trained to provide the critical services and readiness for needed responses. Besides triage at dialysis entry, hospital emergencies would triage patients coming into the dialysis units in the larger hospitals. The ICUs of these referral facilities

protective equipment resources and specially designed medical suits were stitched to treat suspect and positive COVID-19 patients. In the absence of personal protective equipment (PPE) in the marketplace, innovation was key. Additional capacity building was done in training nurses on the management of COVID-19 positive patient care on dialysis, improving infection prevention and transmission, utilising information from laboratory testing and other prevention measures. In addition, critically important in the situation among the staff, was providing the right messages with needed discussions to stay safe from infection, which were repeatedly reinforced. Physical distancing, mask use and hand sanitizer or soap and water use was enforced to force everyone to observe personal hygiene. Lastly, ensuring the frontline team stayed calm and united in patient centric care while also taking the necessary precautions to ensure our staff's safety.

Managing COVID-19 Externally and Internally – Learning and Innovating to Achieve Best Outcomes

All genuine public health, WHO and key government outputs online, radio programmes, online and



TV or news reports on the disease activity of spread, recovery and deaths were captured on a daily basis from across regions by the senior management on a common WhatsApp thread. This was used for dynamic planning and management, as new information emerged from all the government and international sources needing varied interventions depending on the situation. This information also needed to be vetted for accuracy. Additionally weekly reports were sent summarising our region's status report.

AHN's work of ongoing support to respond during the outbreak was drawn from its experience of its well-organised operations across the East African regions. However, public hysteria and mass hoarding created a situation where healthcare institutions were battling

since the influenza outbreak in 1918, no therapies have been proven to be effective to date. Despite the numerous ongoing clinical trials, none of the potential repurposed drugs used in the trials were available in East Africa. The use of steroids was dissuaded by the WHO. The question was: what's next? The only drug reported as being used in China and Italy, available in Dar es Salaam was the oral antibiotic azithromycin which was a relief as there seemed no drug shortages, at affordable costs. Literature reported this drug to have a beneficial anti-inflammatory and anticytokine effect in COVID-19, preventing inflammation to some degree, especially those which affected the activation of the coagulation pathways. But this alone was certainly not enough for the treatment of COVID-19.

Public hysteria and mass hoarding created a situation where healthcare institutions were battling COVID-19 on two fronts: care and procurement

COVID-19 on two fronts, care and procurement; local healthcare distributors drastically increased prices and repurposed sales towards shopping malls opting to capitalise on this hysteria increasing prices 25-100 fold. Nevertheless, our teams carried out the dialysis procurement, supply-chain services, and had existing inventory systems ensuring procurement of six months stock. Close oversight of logistics, supplier communications, potential regulatory bottleneck were overcome for urgent supplies of needed dialysis consumables and medical supplies, for adequate stocks. PPE of all sorts were procured for all the COVID-19 units as the threat loomed closer. Cloth masks were designed and stitched locally for all the patients when market did not have masks. Masks were later sourced from the market with guidelines when and how to reuse, as needed at the frontline. Goggles, face shields and boots were obtained from the market. Initially protective gowns were obtained from the market, but later due to shortages specially designed gowns with a hood for complete bodily protection were stitched to enable laundry and sterilisation daily, ensuring adequate stocks. Special remote oversight of the supply chain and inventory impacts was kept over core operations within the dialysis units remotely during the COVID-19 crisis. Numerous repurposed internal resources were also made available to the frontline as needed. But still a solution was needed for medication prophylaxis and therapies.

With the COVID-19 pandemic being the greatest global public health crisis of the current era, possibly

Creating a Cost Effective, Available, Accessible and Outcomes Driven Approach to COVID-19 Management in a Resource Constrained Environment

Finally, after extensive COVID-19 literature search, it was in late March 2020, with COVID-19 already in the cities and communities, a letter to the editor from Italy in the American Journal of Transplantation, reported the successful use of the drug colchicine in one of two transplant patients with COVID-19 on the ventilator that provided the break. Colchicine, a plant alkaloid, extensively used, freely available and affordable, was used to replace an expensive biological anti-cytokine drug tocilizumab due to the latter's non-availability. Since colchicine had the same spectrum of anti-inflammatory and anticytokine effects as in COVID-19, it was repurposed for use in the treatment of COVID-19. As an anti-inflammatory drug, it is extensively used in Europe as first line therapy for Familial Mediterranean Fever (FMF), a known illness in the region. The drug was also available in plenty in East Africa at affordable costs, with nobody needing it, which started our tryst with colchicine. Research into colchicine got us to the mechanism of action, safety profile, drug interactions, use and doses in patients with end stage kidney disease on dialysis and the potential advantages of its combination with another support drug azithromycin with a complimentary anti-inflammatory spectrum.

Coincidentally, COVID-19 had emerged within the AHN units at Dar es Salaam. Vigilant screening had begun to identify patients with symptoms and early COVID-19 who were positive on testing. The COVID-19 teams began their work of managing patients who were suspect and positive clusters with isolation dialysis. The numbers began to swell by late March and April 2020. Initial patients were admitted and started on colchicine and azithromycin therapy as planned in the treatment guidelines. But soon when early disease was identified and treated with colchicine and azithromycin, experience taught the team to treat them as outpatients, self-isolate at home and dialyse as an outpatient. Being the only centre treating COVID-19 in the initial stages of the pandemic within the city, referral for dialysis from the other hospitals began to pour in. But these were sicker patients with more of respiratory symptoms and lower levels of blood oxygen levels since they came into the hospital after being symptomatic for over 8 to 10 days. Most of these patients came from hospitals elsewhere with no ability to manage, needed admission and were sicker with more cardiac comorbidity in comparison.

Managing these two sets of patients hence provided an experience of the 1) early in-centre patients who rarely needed admission and 2) the late presenting sicker patients with more severe disease – a challenge to treat. Even at this stage, oxygen therapy remained the lifesaving mainstay as there were hardly any ventilators available. The learning was that early therapy of COVID-19 with colchicine, serving as a base, and azithromycin, a support drug, had outstanding outcomes, even if the system did get overwhelmed. We had accomplished a zero mortality rate of all our own dialysis COVID-19 positive patients and lost only four of the referred patients with severe underlying cardiac disease and late presentation to the hospital from amongst the dozens of referrals. A meeting of the nephrologists from across the city allowed us to share with all nephrologists our colchicine protocol use and outcomes – which led to implementation across the region. This cut down the referrals to our centre in the next couple of weeks. The AHN protocols and treatment guidelines were shared widely across countries amongst known nephrologists, and further colchicine was also used in elderly patients across the city with early disease. But the moral of the story was, colchicine, given early, had a quick response in preventing or reducing the inflammatory response of the body in COVID-19, preventing, or ameliorating the lung injury or activation of the clotting system; and, ultimately, collaboration is key.

Colchicine Prophylaxis in the Absence of Vaccines and Anti-Viral Therapy

With the outstanding response of colchicine in early disease, it was next extended as a prophylaxis for COVID-19, as evidence already pointed out good results with its prophylaxis in gouty arthritis and FMF. With the spread of COVID-19 out of Dar es Salaam and fearing another COVID-19 battle outside in the more remote areas, prophylactic colchicine was started in 74 patients at a large centre in Northern Tanzania. In the first few days, three patients came in with symptoms of early COVID-19 which could easily be managed but those were our last patients with COVID-19. Colchicine as a prophylaxis now has been extended to all our dialysis patients in Tanzania and Rwanda to prevent COVID-19 across all the centres. Not a single patient has presented with COVID-19 amongst our dialysis population since May 11, 2020. The same was now again shared with all our colleagues, partners and even competitors across the board and abroad; united against a common enemy. A unique experience, with a lot of potential to be used in the developing world, provided the opportunity to present an educational webinar for the International Society of Nephrology to share all the findings to the world at large.

Rinse Repeat – Plan, Do, Study, Act (PDSA) – Creating a Culture of Continuous Improvement

Although COVID-19 is no longer seen in any of our units today, we are nowhere near the end. With no vaccine coming in the near term, we as an organisation are embracing continuous improvement to innovate and adapt our response to COVID-19 both for prophylactic purposes for our at risk patient population and for those who present symptoms and/or are diagnosed as COVID-19 positive. This includes continuous monitoring of the COVID-19 manifestation in the region, engaging internal and external partners to ensure we have the most up-to-date information, working with supply chain to ensure we are well prepared to act, and then ultimately, act on the information we have to best equip our teams to ensure our patients receive the highest quality of care. This is only the beginning, collaboration and continuous improvement are key to winning the war against this COVID-19 storm. ■