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Africa has higher death rate among critically ill COVID-19 patients than any other world region, study suggests

Death rates among adults in the 30 days after being admitted to critical care with suspected or confirmed COVID-19 infection appear considerably higher in Africa than globally, according to a prospective observational study from 64 hospitals in 10 African countries published in *The Lancet*.

The study, based on 3 140 adults between May and December 2020, found that the death rates of the said patients appear considerably higher in Africa with an average 48.2% patients than a global average of 31.5% patients.

A critical factor in these excess deaths may be a lack of intensive care resources and underuse of those available, say the researchers, who are all based in Africa. For example, half of patients died without being given oxygen, and while 68% of hospitals had access to renal dialysis, only 10% of severely ill patients received it.

Professor Bruce Biccard, deputy head of the Department of Anesthesia and second chair in Anaesthesia at UCT, who co-led the research says: "Our study is the first to give a detailed and comprehensive picture of what is happening to people who are severely ill with COVID-19 in Africa, with data from multiple countries and hospitals. Sadly, it indicates that our ability to provide sufficient care is compromised by a shortage of critical care beds and limited resources within intensive care units."

He explains: "Poor access to potential life-saving interventions such as dialysis, proning (turning patients on their front to improve breathing), and blood oxygen monitoring could be factors in the deaths of these patients, and may also partly explain why one in eight patients had therapy withdrawn or limited. We hope these findings can help prioritise resources and guide the management of severely ill patients – and ultimately save lives – in resource-limited settings around the world."

Until now, little was known about how COVID-19 was affecting critically ill patients in Africa as there have been no reported clinical outcomes data from Africa, or patient management data in low-resource settings.

To address this evidence gap, the African COVID-19 Critical Care Outcomes Study (ACCCOS) aimed to identify which human and hospital resources, underlying conditions, and critical care

interventions might be associated with mortality or survival in adults (aged 18 or older) admitted to intensive care or high-care units in Africa.

The study focused on 64 hospitals in 10 countries (Egypt, Ethiopia, Ghana, Kenya, Libya, Malawi, Mozambique, Niger, Nigeria, and South Africa). Between May and December, 2020, around half of patients with suspected or confirmed COVID-19 infection referred to critical care were admitted. Of those, 3 140 patients participated in the study. All participants received standard care and were followed up for at least 30 days unless they died or were discharged. Modelling was used to identify risk factors associated with death.

After 30 days, almost half of the critically ill patients had died. The analysis estimates that death rates in these African patients were 11% in best case scenario to 23% in worst case scenario higher than the global average of 31.5%.

Of the survivors, 16% remained in hospital, and 84% had been discharged. The outcome of 63 patients is unknown.

The study estimates that the provision of dialysis needs to increase approximately seven-fold and ECMO approximately 14-fold to provide adequate care for the critically ill COVID-19 patients in this study. For example, even inexpensive basic equipment was in short supply, with only 86% of units able to provide pulse oximetry to monitor blood oxygen levels to all patients in critical care. Similarly, 17% of hospitals had access to ECMO, but despite evidence to support its use in COVID-19 patients with respiratory failure, it was offered to less than 1% of patients.

The majority of patients were men at 61%, with an average age 56 years with few underlying chronic conditions. For participants with available data, the most common underlying conditions were high blood pressure (51%), diabetes (38%), HIV/AIDS (7.7%), chronic kidney disease (7.7%), and coronary artery disease (7.7%).

People with pre-existing conditions had the highest risk of poor outcomes. Having chronic kidney disease or HIV/AIDS almost doubled the risk of death, while chronic liver disease more than tripled the risk of dying. Diabetes was also associated with poor survival at a 75% increased risk of death. However, contrary to previous studies, being male was not linked with increased mortality.

“The finding that men did not have worse outcomes than women are unexpected,” says co-lead Professor Dean Gopalan from the University of KwaZulu-Natal, South Africa. “It might be that the African women in this study had a higher risk of death because of barriers to accessing care, or care and limitations or biases in care when critically ill.”

Compared with survivors, patients who died were also more likely to have a higher degree of organ dysfunction (Sequential Organ Failure Assessment [SOFA] score), and required more respiratory and cardiovascular support on admission to intensive care, yet the resources to provide this care are limited.

According to Gopalan: “The quick SOFA score could be a simple tool to use at critical admission in low-resourced settings to help clinicians identify patients with poor prognosis at an early stage and to avoid delays in starting necessary organ support.”

Although critical care units reported relatively high rates of staffing with 24-hour physician coverage seven days a week, and a nurse-to-patient ratio of 1:2, mortality was high, possibly because of a lack of specialised staff, researchers say.

According to co-author Dr Vanessa Msosa from Kamuzu Central Hospital in Malawi: "This cross-continental collaboration has provided much-needed data about our unique COVID-19 patient care needs. Although our younger demographic means that most countries in Africa have avoided the large-scale mortality seen in many parts of the world, in-hospital mortality is suffering from being under-resourced, with only half of referrals admitted to critical care because of bed shortages. Patient outcomes will continue to be severely compromised until the shortfall in critical care resources is addressed."

The authors note some limitations of their study, including that it was mainly conducted in university affiliated, government funded, and tertiary hospitals, and it is likely that outcomes could be worse in lower level hospitals with less resourced critical care units. In addition, the study cohort was younger than other COVID-19 critical care cohorts and is likely to be an underestimate of excess mortality if adjusted for age. They add that although this is the largest set of data on critically ill patients from under-resourced settings, it represents only 10 African countries, and most hospitals were in the relatively well resourced countries of South Africa and Egypt, which may affect the generalisability of the results.

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