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Developing forecasting capacity for public health emergency management in Africa using syndemics approach: lessons from the COVID-19 pandemic

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SUMMARY BOX

⇒ Globally, forecasting is rapidly gaining acceptance in healthcare and its use in public health emergencies like the COVID-19 pandemic has been beneficial to improve emergency preparedness and response towards the pandemic, particularly during the early and peak phases.

⇒ Despite these benefits, forecasting capacity, largely in terms of expertise and support systems, remains significantly limited in Africa, where the burden of public health emergencies is highest.

⇒ Given the syndemics understanding of public health emergencies as extended by the COVID-19 pandemic, we shared our viewpoint on the need to develop a sustainable forecasting capacity in the African region for better health and social outcomes during and after public health emergencies in the region, and globally.

Forecasting is an important aspect of decision-making in health and other social aspects of human life. Forecasting can simply be defined as the process of making probabilities about a real-world event using existing data built in a mathematical model.[1] This understanding underpins why forecasting is sometimes used interchangeably with the word 'modelling'. Forecasting capacity describes a system that comprises of surveillance database, experts and relevant technologies, and it remains an indispensable workforce development need for promoting data-driven decision-making in health, as frequently advocated by the WHO.[2] Generally, the usefulness and usability of forecasting is one that is not unknown or unbeneficial to most people across the world, particularly in non-emergency situations, from its use in daily weather reporting through global projections on economy, and diseases burden. Similarly, from epidemiological perspective, evidence from various forecasting models was observed to have played a major role to improve emergency response in past disease outbreaks (eg, Ebola) and towards the COVID-19 pandemic in the areas not limited to SARS-CoV2 patterns determination, containment and mitigation measures implementation, risk communication, resource management and vaccine development.[3–8]

Despite the demonstrated availability of forecasting capacity and its associated benefits on health protection at the global level, unfortunately, the ownership and usage of forecasting knowledge capita in public health emergency management remain significantly limited at the regional level as laid bare by the COVID-19 pandemic, with Africa being the most disproportionately impacted region, despite having a record high figure of over 100 public health emergencies annually compared with other regions of the world.[9] This disparity in forecasting capacity is reflected in current forecasting evidence on COVID-19 pandemic, where most of the studies were either conducted in the developed regions or for Africa by foreign experts such as in a study by Frost and colleagues.[8] In addition, while anecdotal evidence shows that forecasting capacity exists in some settings in Africa such as academia, governments, non-governmental organisations (NGOs), this capacity is largely under-resourced, uncoordinated and short-term probably due to weak surveillance systems and lack of national emergency forecasting centres or forecasting units within the existing national public health institutes. Other reasons for the ill-developed forecasting capacity in Africa could as well be attributed to the lack of political will and weak partnerships between the government and the academia, where most of the forecasting

experts are housed. Notwithstanding, it is desirable for the African region to increase training, research and funding investments in forecasting capacity development of its workforce for efficient management of public health emergencies including natural disasters and humanitarian crises.

However, given the forecasting capacity gaps in most health systems in Africa, one can only wonder what would have informed public health decisions specific to containment and mitigation, supplies procurement and risk communication in Africa during the COVID-19 pandemic. It is on this premise that the following essential questions need to be asked: were the public health decisions made in the African region during the COVID-19 pandemic informed by local forecasting evidence or colloquial evidence or both? Were the decisions a carbon-copy of global forecasting evidence or were the global forecasting evidence further contextualised with local forecasting or other scientific evidence? How would any of this forecasting evidence have influenced the level of community trust of and adherence to public health measures such as lockdown and vaccine administration? Have the decision-making processes between the public health professionals and policy makers,including methodologies, strategies, challenges, and emerging issues, been documented for future reference?

Certainly, these questions need to be systematically addressed for better decision-making in future pandemics. More so, these questions align with the call for reflective thinking and bold changes in the COVID-19 pandemic era as encouraged by Morgan and colleagues.[10] In the same vein, it was the authors' expectation that national public health institutes should be responsible for conducting or coordinating forecasting analysis of surveillance data to guide local public health actions; however, reported experiences from the field suggest the contrary. For example, in Nigeria, most of the public health actions implemented during the COVID-19 pandemic appear to have been largely guided by foreign evidence and strategies. During the peak of the COVID-19 pandemic, we witnessed the political leaders taking a centre stage in COVID-19 risk communication to the Nigerian public through televised presidential task force meetings like in the USA, even when realities suggest that there is lack of community trust in the politicians in the country. Perhaps the role of this strategy on adherence to public health measures during COVID-19 pandemic needs to be investigated and addressed carefully for best practices.

Furthermore, while a case was made by Morgan and colleagues on the relevance of national forecasting capacities, a strategic action plan for achieving this mandate was not specified. Likewise, our call for forecasting capacity development in Africa is consistent with the submission of Diouf and colleagues, who reported the need to contextualise forecasting models in Africa.[11] A vision we believe would be best achieved with local expertise given context effects on results interpretation and decision-making. Equally, the WHO Regional Office for Africa (WHO AFRO)'s commitment to guarantee health security in Africa through its emergency response flagship programmes that were launched in early 2022 further supports our opinion as well.[9] Even though the WHO AFRO demonstrated forecasting competency during the early stage of the COVID-19 pandemic to understand the trajectory of SARS-CoV2 in the African region and also identified workforce development as one of the core pillars of its emergency response flagship programmes for safeguarding health in the region,[5 9] it did not mention forecasting or modelling as part of the required training competencies.

Nevertheless, we anticipate that the WHO AFRO's emergency response flagship programmes will leverage on some local capacity-promoting emergency management initiatives, in which the WHO AFRO is inextricably part of, such as the Global Research and Analyses for Public Health (GRAPH) network and the WHO Hub for Pandemic and Epidemic Intelligence among others. This is because, for example, the GRAPH network and WHO Hub for Pandemic and Epidemic Intelligence, which seek to strengthen surveillance systems and data analytics for improved decision-making during public health emergencies in the African region and globally, respectively, have recognised modelling as an essential component of their activities.[12 13] Notably, the establishment of the GRAPH network—a group of African multidisciplinary scientists and international collaborators—during the early phase of the COVID-19 pandemic has remained very instrumental to the continued understanding of the COVID-19 pandemic dynamics in the African region.[14–17] Certainly, with these developments, we believe that the WHO AFRO and other African health partners are already well positioned to support the development of a sustainable forecasting capacity in Africa for future pandemics as well as other emergencies.

Central to this course is the adaptation of existing national public health emergency systems to meet the syndemics realities of emergencies as explicitly demonstrated by the COVID-19 pandemic. The COVID-19 pandemic and existing inequity has broadened our understanding of syndemics in public health emergencies through its concurrent complex interactions with comorbidities (eg, hypertension, diabetes) at the biological level and social issues (eg, economic contraction, food scarcity) at the societal level, which worsens public health outcomes and eventually delay emergency recovery.[18–20] In practice, since the response to the COVID-19 pandemic has been multisectoral involving sectors not limited to health, social and economic, a multisectoral approach is also logically warranted to collect accurate, quality and real-time data in an integrated format that truly reflect a real-world scenario for forecasting and its applicability in the field. In fact, with the well-known realities in the African region such as weak health systems and scarce resources, we argue that over-reliance on foreign forecasting evidence, expertise and technologies in Africa not only risks poor public health outcomes in the region given contextual differences, but also globally due to spill-over effects, as currently being observed with emerging SARS-CoV2 variants in regions of the world, particularly Africa, with low vaccine coverage rates due to lack of local vaccine manufacturing capacity.

Therefore, there is an unmet need to urgently develop a sustainable forecasting capacity that is rooted on syndemics approach in Africa to improve innovations, knowledge

sharing and coordination for context-specific, holistic and efficient public health emergency management in the region. We recommend that the strategy for developing a public health emergency forecasting capacity should be one that reinforces multisectoral and multilevel collaboration, coordination and commitment among relevant stakeholders. The stakeholders should include but not limited to the community, centres for disease control (CDC), academia, national emergency management agencies, food sectors, finance departments, national statistics agencies, faith-based organisations, NGOs, communication agencies, political forums and international partners. Also, the capacity should be built such that it ensures data capture, data integration and data dissemination from the community level through the regional to the global level using a syndemics-oriented real-time tool developed based on the 'FAIR guiding principles of data management', namely, findability, accessibility, interoperability and reusability.[21] And, to ensure sustainability of this initiative, stakeholders should consider the establishment of forecasting association, conference, training fellowship and research grant at the regional level with representation nationally as well.

More importantly, we think that the real question that should be asked is, how do we proceed from here? As answer to this question is context-specific, any suggested solution would, however, not always be a one-size-fits-all solution, and its applicability would need to be carefully reviewed, putting into consideration the realities of existing resources and the political landscape of the study setting. Nonetheless, we believe that our viewpoint is a step in the right direction to stimulate timely discussion among the WHO Hub for Pandemic and Epidemic Intelligence, WHO AFRO, Africa CDC, national public health institutes, national governments, academia, funders and other stakeholders on development of sustainable forecasting capacity in Africa in addition to ongoing discussions towards strengthening public health emergency management in the region and ensuring global health security.

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