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POLICY BRIEF

Strengthening the COVID-19 Response in Zimbabwe: COVID-19 diagnosis in Frontline Health Workers

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14 August 2020

Background

Following the 14th Cabinet Meeting Decisions Matrix of 5th MAY, 2020; the Chairman of the Ad-Hoc Inter-Ministerial Task Force on COVID-19, Honourable Vice President K.C.D. Mohadi presented the weekly report on the national preparedness and response to the COVID-19 outbreak, which was adopted by Cabinet. The progress in the fight against COVID-19 was noted. Specifically noted was the progress registered in the area of research and development as follows:

The establishment of a local consortium of researchers spearheading research into COVID-19 drawn from IamBYO-Fighting COVID-19 initiative, the National University of Science and Technology (NUST) and the University of Zimbabwe (UZ) -led by TIBA Zimbabwe collaborating with the University of Edinburgh. TIBA Zimbabwe is part of the Tackling Infectious Diseases for the Benefit of Africa (TIBA) Partnership, represented in 9 African Countries. TIBA is an Africa-led research programme that explores and draws lessons from -how different African health systems tackle infectious diseases in Botswana, Ghana, Kenya, Rwanda, South Africa, Sudan, Tanzania, Uganda and Zimbabwe. TIBA is funded by the National Institute for Health Research, Global Health Research programme using UK aid from the UK Government.

Management of the COVID-19 country-specific research efforts were to be conducted following the Government of Zimbabwe Innovation Framework. Promising research outputs would progress to the Innovation Hub for refinement, prototyping and legal protection before ultimately moving to the industrial park for commercialisation. Based on the fight against COVID-19, the research programme would be undertaken within five (5) pillars of focus as follows:

- Scientific Understanding of Corona Viruses and COVID-19
- Biopharmaceutical Engineering
- Clinical Understanding of the Corona Viruses and COVID-19
- Biomedical Engineering and
- Formulation of National Health Strategy on COVID-19.

In light of the foregoing, Cabinet agreed that:

1. TIBA Zimbabwe conducts research into the strengthening of the COVID-19 response in Zimbabwe with the following objectives:
2. Evaluate uptake and impact of antibody and PCR testing of frontline health workers.
3. Validate antibody tests in Zimbabwe against other antibody tests and the PCR gold standard.
4. Describe the sero-epidemiology of COVID-19 in frontline health workers to determine herd immunity levels (if any) among frontline health workers.
5. Describe the nature and dynamics of the cytokine storm in COVID-19 patients.

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Current state of Zimbabwe's COVID-19 epidemic

Based on the TIBA COVID-19 situation report for WHO Africa Region on 07/08/2020 which analyses the COVID-19 Epidemiology in all WHO AFRO member states weekly, Zimbabwe has 4339 reported case(s) making it (19th in the region) and 84 reported death(s) (16th). Cumulative counts per 10,000 population of reported cases and deaths are 3 (26th) and 0.058 (25th) respectively. The weekly ratio of new cases and deaths indicates that these are growing very fast. The weekly ratio of reported cases over the last 2 weeks is 1.7 (4th). The weekly ratio of reported deaths over the last 2 weeks is 2.9 (2nd). Report is available on: http://tiba-partnership.org/tiba/sites/sbsweb2.bio.ed.ac.uk.tiba/files/pdf/WHO-AFRO%20COVID-19%20Situation%20Report%2007.08.2020.pdf

Why the research was conducted

The imperative to 'test, test, test' became the slogan of the COVID-19 pandemic since it was voiced by the World Health Organization's Director General in March 2020. On April 8th, the WHO issued their advice on the use of point of care immunodiagnostic tests for COVID-19. On antibody tests they indicate that "tests to detect antibody responses to COVID-19 in the population will be critical to support the development of vaccines, and to add to our understanding of the extent of infection among people who are not identified through active case finding and surveillance efforts, the attack rate in the population, and the infection fatality rate". Furthermore, they indicate that they "...encourage the continuation of work to establish their usefulness in disease surveillance and epidemiologic research". In this research in Zimbabwe, the researchers were responding to this call. Thus, this study was conducted to strengthen informed response to the pandemic both nationally and internationally.

When and where was research conducted

The research study was conducted in the city of Bulawayo. The study commenced with an official launch by the Minister of State for Provincial Affairs and Provincial COVID-19 Task Force Leader, Hon. Judith Ncube on 9 June 2020. The launch was followed by a training of research assistants and subsequent data collection from 10-22 June. Frontline health workers (FLHW) were interviewed, and, nasal swabs and blood samples collected and analysed at Mpilo Laboratory. A total of 713 frontline workers participated in the study. Participants were drawn from the following 24 institutions: Mater Dei private hospital, UBH, Mpilo and the following Bulawayo City Health Institutions including: Cowdray Park, Dr Shennan, EF Watson, Emakhandeni, Entumbane, Khami Luveve, Magwegwe, Maqhawe, Mpilo, Mpopoma, Mzilikazi Njube, Nkete, Nkulumane, NSC, Pelandaba, Princess Margaret, Pumula, Pumula South, Thorngrove, Tshabalala.

Overview of results to date

Frontline health workers' willingness to test, and desire to remain in active service post knowing their status

1. Out of the 713 FLHWs who participated in the study, 89% (635) were willing to have a blood sample taken; 78% (560) were willing to have the nasal swab taken. The reason for not giving consent for a nasal swab was the adverse effect of pain during collection of the sample which they had experienced in a prior independent sample collection exercise.
2. The study indicated that 209 out of 635 (33%)of the front line health workers were poorly informed on the difference between and meaning of antibody/serology vs. PCR tests. Of the 635, 161 (25%) and 166 (26%) did not know the meaning of a positive antibody or PCR test respectively. The study also demonstrated that some of frontline health workers did not understand the need for recurrent/repeat tests. Their understanding was that once they had established their infection status, this would remain the same for the duration of the pandemic.

Performance of antibody tests kits currently available in Zimbabwe against each other and against the gold PCR standard.

1. We tested 3 antibody tests (Onsite COVID-19 IgG/IgM rapid test, the StandardQ COVID-19 IgM/IgG Combo (SD Biosensor) and Wuhan UNscience Biotechnology Companies UNICOV-40 test kit). The manufacture indicated that the WUHAN test a clinical sensitivity of 98.511% (95% CI: 96.788%, 99.452%) and specificity of 88.208% (95% CI: 83.086%, 92.221%) (https://www.stratech.co.uk/wp-content/uploads/2020/03/Manual_UNCOV-40_IVD.pdf). The UNICOV-40 test has a 91% agreement with the the StandardQ test IgG test and 79% on IgM.
2. All the 57 samples that tested positive for SARS-COV2 by the antibody were negative on PCR test while 2/112 of the antibody negative, but with self-reported contacts with COVID-19 confirmed cases tested PCR positive giving a prevalence of 2% SARS-COV2 infection in the frontline health workers with a known COVID-19 contact. Therefore people who had positive antibody tests i.e. those who had seroconverted were not positive by PCR.
3. All cases that tested antibody negative by the UNICOV-40 test kit without known SARS-COV2 contact were PCR negative.

Prevalence of seroconversion among frontline health workers

1. 57 out of 635 participants (9%) of the participants tested positive for antibodies by the Wuhan UNscience Biotechnology Companies UNICOV-40 test kit, suggesting that these people had been exposed to SARS-COV-2 infection.
2. Out of these people who tested positive for antibodies 15,8% (n = 9 out of 57) had been exposed to a confirmed COVID-19 case. The remaining antibody-positive people (48 out of 57) were not aware how they had been exposed to SAR-COV-2 virus.

3. None of the people that tested positive for antibodies had any COVID-19 clinical symptoms.
4. None of the people that tested positive for antibodies were positive for current infection via PCR.
5. The study indicated that all categories of patient facing staff are at risk ranging from drivers, general hands to the clinical staff were exposed to SARS-COV-2 (see graphs below)

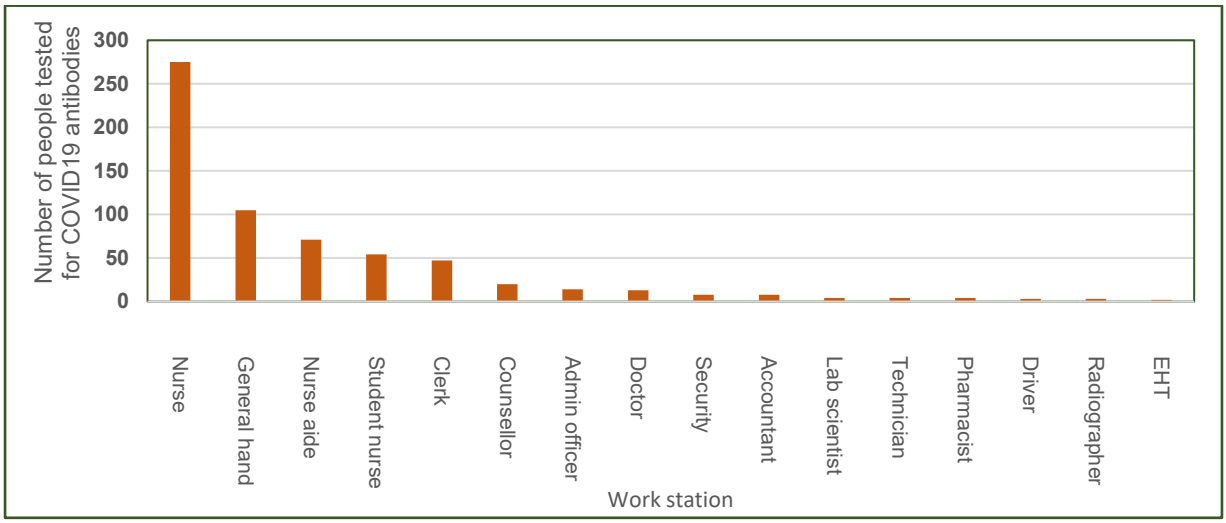

Figure 1: Total number of patient facing health workers tested

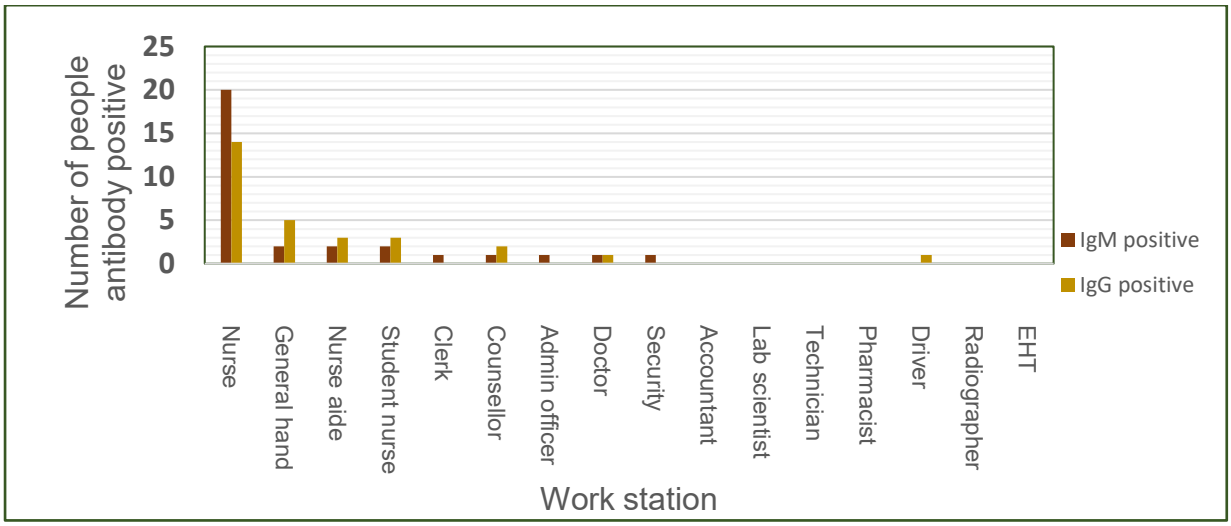

Figure 2: Number of patient facing health workers testing positive for COVID19 antibodies

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Overview of main policy implications

Knowledge Attitudes and Practices:

1. It is important to educate health care workers on the difference between an antibody/serological test and PCR and most importantly on the meaning of a positive antibody test vs. a positive PCR test.
2. It is important to educate the health workers on the need and importance of recurrent/repeat PCR tests.
3. It is important to keep abreast of the development of non/less invasive PCR sample collection techniques to reduce the side effects of PCR sample collection and hence increase compliance to recurrent/repeat tests.

SARS-COV-2 Testing

Improve testing by the following means:

1. Supporting local laboratories to avail quick turnaround, affordable PCR testing.
2. Prioritising PCR testing for healthcare workers to provide a shield for patients and between patients and the community.
3. As per WHO recommendation, antibody/serology is not a diagnostic test for SARS-CoV-2 infection or COVID-19 disease. SARS-COV-2 diagnosis should be done by PCR.
4. Antibody/serology test is useful for surveillance and epidemiology studies.
5. Any new diagnostic test should be evaluated in Zimbabwe before widespread use.

Reducing hospital and community infections

1. Provide biosafety and biosecurity education for all patient facing staff at health centres.
2. Provide Personal Protective Equipment (PPE) and hand hygiene materials for all patient facing staff at health centres in accordance with their position; i.e. nurses and nurse aides are more exposed and therefore require full PPE whereas e.g. drivers and receptionists require face masks and sanitizer.
3. Testing of frontline health workers should be considered a public good and be fully financed by the government, and conducted on a regular basis.
4. The current requirement of a negative PCR test as a pre-requisite for admission of patients is a counterproductive measure which can endanger patient health. Instead, patients coming into hospital should be assessed for COVID-19 clinical symptoms and history of exposure. If suspected of infection they should be isolated and tested for SAR-COV2 infection to protect health workers and other patients.

Documentation, Knowledge-based initiatives:

Given the current epidemic course, it is imperative to understand the disease progression and containment. It is therefore urgently requested that the TIBA team is given access positive cases and the biobank for further research.

Team

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