

Review of Nigeria Biosecurity Architecture: Prospects, Challenges and Awareness

Igwe, J.C¹, Adeboye, S.E², Egbulefu, C.S² and Parom S.K¹

¹Department of Pharmaceutical Microbiology and Biotechnology, Kaduna State University, Kaduna

²National Biotechnology development Agency, Abuja

Abstract

Ensuring immediate and effective biosecurity in Nigeria has become imminent following the turnover of events within Nigeria and the globe. These emanating events such as emerging and reemerging diseases, both in human health, agriculture and the environment, signal for safety towards one health approach. They also call for the need to ensure that the next outbreak of infectious diseases or reemerging global pandemic does not emerge from our environment or bioengineered by one of us in quest for research output. This fundamental has enabled us to review some identified issues and proffering possible recommendations.

Keywords: Nigeria, biosecurity, challenges, prospects, bioterrorism, one health

Corresponding author: Igwe JC contact: igwejames42@yahoo.com

Background

General opinion has defined biosecurity as measures aimed at preventing the introduction and/or spread of harmful organisms (viruses, fungi, parasites, and bacteria) to human, animal, and plants in order to minimize the risk of transmission of infectious pathogens (Renault *et al.*, 2021). Developing strategies through enacting policies, creating public awareness, education, training and designing mechanisms that tends to manage biosecurity risk to forestall the impacts of pests, diseases, weeds or contaminants on the economy, environment, or community towards one health approach is imminent and timely now in Nigeria for safeguarding lives and the ecosystem.

The growing trends of infectious diseases and associated events globally has once again called for the need to review country-based biosecurity design and approach towards one health. From time immemorial human, animal and its environment have all cohabited mutually, but the rising environmental climate changes, human noncompliance to rules, increase interest of state actors, developing dual use of microbes through

biotechnology, political dynamics in developing policies for transfer of biological materials, waste treatment and management, research etc have all contributed to incessant outbreak of infectious diseases.

Methodology

Secondary data and open access sources from Google, journals, and news publications from 2010 – 2022 were deployed to conduct this review.

Prospects of Biosecurity in Nigeria

As of 2022, Nigeria's population was estimated at around 216.7 million, with a forecast of 400 million in 2050 making it the giant stride of Africa by population. It's worthy to note that 33% (71,280,000) are unemployed with a chronological data depicting that the unemployment rate in Nigeria do rise constantly in the past years (Onwubiko, 2021; Sasu, 2022). Also, more than 33.6 million Nigerians are classified as adolescence, within the ages of 15 to 35 years (UNICEF 2022). According to World

Bank statistics, it is estimated that approximately 95.1 million Nigerians will become poor at the end of 2022, necessitated by sluggish growth, low human capital, labor market weaknesses, and exposure to shocks. These high-flying red signal factors", which could serve as baseline component to employ frontline personnel for dual purpose necessitates a review in Nigeria biosecurity architecture (Nasir, 2022).

According to the National Security Adviser, Major General Babagana Monguno, retired, at the Nigeria International Partnership Forum held on the sidelines of the Paris Peace Forum: Nigerian borders are porous and had remained a major source of concern as it aids smuggling of prohibited items and irregular migration as well as other trans-national organized crimes and human trafficking (Monguno, 2021; Nosiri and Ohazurike 2016). Another significant factors that could encourage possible crime disposition in Nigeria are large sizes of Nigerian water ways and land borders, which is very big compared to the mini number of securities personnel deployed for safeguard (Punch, 2023). These facts call for concerns among stake holders on the safety of Nigerians. According to Former Provost Marshal, Brigadier-General Ikponmwun, rtd, there are over 2000 illegal and unmanned entry points to Nigeria from our borders with Niger, Chad, and Cameroon (Nosiri and Ohazurike 2016). An epidemic outbreak originating from Nigeria will have significant impact on Africa and the global community, this makes biosecurity call important and of global concern (Akpan and Umelo, 2020).

Challenges Of Biosecurity in Nigeria: Global Rising Outbreak of Infectious Disease in Post Covid Era

Till date, the misery behind the outbreak of covid-19 is still uncertain and no country has owned to its cause and use as bioagent (Kotwal and Yadav 2021). Even the World Health Organization till date still wonder on its global outbreak spread, Covid-19 economic impact, sociocultural influence, exposure of unprepared medical facilities, mortality, impact on developing countries, increased unemployment rate, its global community stigmatization and influence (Davies, 2008). These underlining factors call for concerns and biosecurity conference on one health from those in academic, security, the political class, epidemiologists, health regulators etc.

On Friday 27th May, 2022, Chief Igor Kirillov; the Defence Troops of the Russian Radiation, Chemical, and Biologicals, stated categorically that the US Military has 3 Biological laboratories in Nigeria, domicile in Lagos, Abuja and Zaria, that engineered and introduced monkeypox, a relation of cowpox and smallpox that has the ability to cause skin rashes with severe/mild headache, swollen lymph nodes, fever, muscle pain and possible exhaustion in to the environment (Kirillov, 2022; Shehu, 2022). This claim caused a global health panic and increased wearisomeness of such possible Biolabs in Nigeria the weeks after (Tsukanov, 2022). The major concern was that Nigeria is the most populous Black Nation in the world and occupies a strategic socioeconomic and diversity influence on the continent of Africa (WAG, 2012). An outbreak emanating from Nigeria can easily spread throughout the globe as traveler moves in and out of the country on daily basis. According to Chief Igor Kirillov statement, the outbreak of smallpox in Nigeria, which is presumed to be 10 times fatal than Covid-19 will create a gross global catastrophic pandemic for all. Kirillov emphasized that it has been the model of the US Military to repeatedly violate the biosafety rules in other countries by carelessly stockpiling pathogenic biological materials, in the name of research. Hence, he called for WHO investigation of all US-funded laboratories in Africa including those situated in Abuja, Lagos and Zaria, Nigeria, and submit an independent report of their findings to the international community (FNA, 2022).

Although the Nigerian center for disease control had on 1st June, 2022 refuted the claim that Nigeria has no laboratories where Monkeypox Virus is generated, more biosecurity and surveillance checks are needed and should be put in place to prevent any opportunistic development, where possible violation of biosecurity requirements could be bridged or hijacked, leading to the use of this pathogen for terrorist purposes (Stephen et al., 2022, WHO, 2022a).

As at the time of this draft 23 non endemic countries globally have reported incidence of Monkeypox Virus, 5 in Africa (Nigeria (46 cases & 0 deaths), Cameroon (25 cases & 9 deaths), Central Africa Republic (8 cases & 2 deaths), Democratic Republic of the Congo (1284 cases & 58 deaths), and Republic of the Congo (2 cases & 0 deaths)) (WHO, 2022b). However, there was high mortality rate among young people within

the ages of 15 – 35 with untreated HIV (Ogoina, 2022; WHO, 2023). Much stringent measures must be taken into consideration in Nigeria to ensure safety of all.

Although Nigeria relationship with the US gave an “olive branch” and unprecedented privileges for skilled manpower development and supplies of fundamentals required during the COVID-19 pandemic, to support health programmes, like HIV/AIDS, malaria elimination etc effort should be made to ensure that we do not break biosafety rules (Thisday, 2022;). Hence, we must not wait for evidence to respond/mitigate biosecurity-bridges rather develop plans to prevent possible occurrence (Mordor Intelligence, 2023). Russia allegation pulls for concern among Nigeria Bioscientist and call for more awareness and creative inclusive research from all organs of government to ensure biosecurity and biosafety in all institutions in Nigeria especially the Tertiary institutions in Nigeria where freewill/independent research are approved to be carried out for human development purposes.

Growing Biotechnology Centers and Biosecurity Concerns in Nigeria

From Mordor Intelligence, (2023) report, this study acknowledges the fast-growing dynamics in the Nigerian clinical laboratory services market. This was valued at USD 527.68 million as at 2021 and is estimated to increase geometrically to USD 695.11 million by 2027 with a record of nearly 4.7% Compounded Annual Rate of Growth (CAGR) within the space of time under review (2022-2027) (IMR, 2022). Also, non-accounted for and independents non-regulated over 60 biotechnology centers/business premises springing up in Nigeria without checkmates calls for concerns of who does what and why. The biotechnology industries are relatively new and distinct fields that involve using living organism to produce desired product. These industries include those that manufacture, market, and develop agricultural, biomedical, nutraceuticals, pharmaceuticals, and environmental control materials (both consumables and non-consumables) etc.. based on advanced biotechnology research (Bowman and Ward 2016). These products are generally being used by indigents and most Nigerian. A proper understanding of global competition, biotechnology industries and the need for foster biosecurity mechanism will give more room and also attract investors on managing concern raised in biotechnology industries.

Although the National Biotechnology Development Agency Act, 2022, that gave the legal basis to the Agency to conduct, design and model research and also propagate public awareness in all areas of biotechnology to build trust and synergy between government and private sector for participation and investment in biotechnology industry in Nigeria has been approved by the President (Choji, 2022), the National Biosafety Management Agency, empowered by law to checkmate biotechnology activities in Nigeria must own to their responsibility in ensuring safety and biosecurity inline to one health.

The Need for Awareness on Biosecurity in Nigeria

The biosecurity architecture of Nigeria is seriously under a grave challenge, as there exists the possibility of future biological outbreak of both emerging and reemerging diseases in Nigeria, which could either be naturally or man-made. The sudden outbreak of anthrax in a mixed livestock farm in Niger State in July, 2023 and the sudden outbreak of a variant of *Corynebacterium diphtheriae* that produces more virulent toxin, which has influenced morbidity and mortality in children from December, 2022 till late 2023, call for possible stakeholders meeting for serious awareness on public health (NCDC, 2023 and WHO, 2023). Although Nigeria might have overcome/survived series of these outbreaks in the past, the future still remains deem due to porous borders and inadequate biosecurity surveillance, response and management (Chinedu, 2019). It is an established fact that infectious diseases have no boundary; the porous borders, increase in poverty index, inflation, banditry and other rising criminal activities and social vices hold strong key to possible transnational dissemination of infectious pathogens. Any infection on Nigeria population has the possibility of affecting the global village within 72 hours, as Nigerians travel across the globe. Therefore, ensuring immediate and effective biosecurity awareness in Nigeria has become imminent following the turnover of events within Nigeria and the globe (Olumade *et al.*, 2020).

Summary

1. The porous Nigeria border is a major trait to biosecurity in Nigeria as smuggling of prohibited items and uncontrolled migration as

well as other trans-nationally organized crimes and human trafficking could also encourage importation and possible use of biological weapons

2. Considering the growing population of Nigerians the number of personnel trained in the field of biosecurity is poor and might not be able to manage large infectious disease outbreaks

3. There is poor awareness on biosecurity, and experts in the field need constant training to develop programs and educate Nigerians to ensure community participation because biosecurity is everyone's business.

4. There is hope in keeping our environment safe from possible bioengineered biowarfare if biosecurity become community or everyone business to keep Nigeria safe.

Conclusion and Recommendations

This call for immediate information pulls and management in the office of the National Security Adviser to the President to request all Institutions and their respective Research Ethics Committees through the National Health Research and Ethics Committee domicile in the Federal Ministry of Health, and Research Ethical Committee in the Ministry of Agriculture to submit and evaluate researches being carried out in Nigeria to ascertain who does what and why for national interest. This review hereby leverages on this opportunity to call on the Nigerian Government and Agencies to invest more on policies, manpower, awareness development on biosecurity and implement biosafety, biosecurity and bioethics unity in all Tertiary and Research Institutions to enforce biosecurity and biosafety models so that Nigeria will not be used as guinea pig in testing vaccines, drugs and agent by companies, state actors and vested interest.

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