

Bio-Terrorism Incidents: Nigeria Awareness and Preparedness

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Abstract

Biological agents are microorganisms or their products that can be potentially applied in biological warfare. The use of biological agents as weapons in conflicts has been prevalent throughout history. With the increase in terrorism incidents globally and within the Nigerian environment, as well as the graduation of terrorist groups from their previous objectives of fighting governments to inflicting mass damage and national carnage, bioterrorism actions are becoming a possibility that Nigeria needs to be aware and prepare for. The anthrax-laden letter attacks in the USA in 2001 led to realization of the possibilities of, and dangers posed in bioterrorism actions, and increased investment in preparedness for a potential bioterrorism attack by the US and other developed nations. Defending the nation against possible events involving such agents obviously requires being prepared. The Nigerian security and emergency management sector seem to be totally unprepared for most emergency situations, and therefore may not cope in the face of a biological attack, leading to the increase in spread and effects of such incidents. This article aims to look at the challenges posed to emergency preparedness for potential biological incidents in Nigeria and outline steps that can be taken to prepare for them.

Keywords; biowarfare, bioterrorism, bioweapons

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Introduction

War and infectious diseases have always been closely linked (Roffey et al., 2002). Dead humans and animals as aetiological agents of diseases had been established early on. Biological warfare, therefore, is the application of any infectious agents in warfare situations. Agents applied in biological warfare (biowarfare) include bacteria, viruses and fungi or their products (such as biological toxins). The aim of these agents is the killing or incapacitation of human, animal and/or plant life (Henderson, 1998). Biological warfare is part of what the military terms nuclear, biological, and chemical warfare (NBC). Bioweapons may generally be categorized as weapons of mass destruction (WMDs), since they can affect large populations. Biological weapons may be obtained and deployed by countries and non-state actors in scenarios and be termed bioterrorism, especially where it is done secretly to avoid detection (Roffey et al., 2002). The use of biological weapon is currently prohibited under Customary International Humanitarian Law (Henderson, 1998).

Bioweapons are preferable by terrorists due to lower costs of production than conventional weapon systems, the ease of acquiring biological agents, their inability to be detected by available security systems, ability to be transported between locations easily and the intended effects; incapacitation and/or death of targets (Osterholm, 2001). With the increase in

terrorism incidents globally and within the Nigerian environment, as well as the graduation of terrorist groups from their previous objectives of fighting governments and causes to inflicting mass damage on civilian populace and national carnage, it is pertinent that Nigeria as a nation assess its readiness in case of an incident.

Bioterrorism response and preparedness is still in its infancy in most western countries, but virtually nonexistent in developing countries. This coupled with the poor state of health infrastructure, security loopholes, lack of interagency communication and cooperation and a nonexistent national emergency policy, preparedness pose great risks in the event of a biological incident.

Historical review of biological warfare

Rudimentary forms of biological warfare have been practiced since antiquity (Henderson, 1998). Assyrians have been known to poison their enemies as far back as the 6th century BC. The Mongols in 1274, used the corpses of warriors who had died of plague against the besieged city of Kaffa. Smallpox was also used by the British in 1763 against American Indians (Christopher et al., 1999).

The potential application of biological agents in warfare was further aided in the 1900s by new discoveries such as in bacteriology, and the germ theory. The German Empire particularly undertook acts

of biological sabotage using anthrax and glanders during World War I (Robertson and Robertson, 1995).

The first successful weaponisation, and production of biological agents was carried out in the UK during World War II using tularemia, anthrax, brucellosis and botulism toxins (Henderson, 1998). Other nations involved in that conflict also developed bioweapons programs of their own about the same time (Roffey et al., 2002).

The most infamous use of biological weapons was by the secret imperial Japanese army unit 731 which carried out the most notorious biological weapons program during World War II. The unit produced weaponised biological agents for offensive use, from experiments done using human prisoners (Burke, 2000). The first aerial bombing with biological agents was carried out by the Japanese air force on Ningbo, China, in 1940 with ceramic bombs full of fleas carrying the bubonic plague (Henderson, 1998).

Bioweapons programs became accelerated with the cold war, with the major superpowers weaponizing plague, anthrax brucellosis, tularemia, equine encephalomyelitis, and vaccinia viruses. In 1972, several countries, including the United States, signed a treaty prohibiting the further research of biological weapons and calling for the destruction of all existing stockpiles (Burke, 2000). However, between 1975 and 1983, both Laos and Cambodia were attacked with suspected biological weapons (Byrnes, King, and Tierno, 2003) and accidents occurred in the former Soviet Union and England (Burke, 2000). This has led to concerns over the proliferation, accidents, and the consequences of biological weapons use. A treaty to control the acquisition, stockpiling and deployment of biological weapons has been in effect since 2011, signed by 165 countries.

Bioweapons and terrorism

Burke, (2000) has referred to biological weapons as "the poor man's atom bomb" due to their ease and cheapness of production and virtual undetectability. This he says makes them the potential weapon of choice for terrorist groups seeking to inflict mass damage with minimal costs. Bioterrorism events were previously thought to be unlikely (Henderson, 1998). Current evaluations indicate that terrorists are shifting from the primary motivations (from 1975 to 1989) of protesting autocratic and wrong government policies to the pursuit (in the 1990s forward) of anarchy and social carnage (Roffey et al., 2002).

Bioterrorism incidents are now occurring and increasing, becoming a growing concern (CDC, 2011). In 1981, the disciples of Bhagwan Shree Rajneesh in Wasco County in Oregon, USA, used *Salmonella* bacteria to contaminate salad bars at several restaurants in the Dallas area, to seize control of the local Government. The number of cases of food

poisoning filled the local hospital to overflowing. A second wave of attacks sickened many others, though, there were no fatalities; the worst case being a pregnant woman who prematurely delivered an infected baby. Samples of the pathogenic microbes were ordered from the American Type Culture Collection and VWR Scientific.

The Japanese terrorist cult, Aum Shinrikyo released (neurotoxic) sarin gas in the Tokyo subways in 1995 resulting in over 5500 injuries. This completely overwhelmed Tokyo's 260 hospitals. The anthrax-laden letter attacks on the USA during September and October 2001 elevated society's awareness of vulnerability to terrorist attack and the use of biological weapons to inflict mass damage with minimal efforts. Thirty-seven people were exposed to the bacteria, 5 people died from the exposure (Byrnes et al., 2003).

The Nigerian security situation

The security situation in Nigerian has shown very clearly that Nigerian is more threatened from within than from without or any external aggressors (Egbeifo and Salihu, 2014). The Nigerian security landscape has witnessed a variety of conflicts, with increased urban violence coordinated by ethnic militia leading to outbursts of intra-ethnic in major cities.

Although Boko Haram may seem the deadliest enemy the Nigerian state faces based on frequency in media reportage, various agents are also involved in the security situation in Nigeria, each posing serious threat to the peace and security of the nation. Attacks by these various agents are currently as deadly as that of the former (Adibe, 2012). Attacks by these actors are becoming more sophisticated, giving concerns nationally and internationally (Uzodike and Maiangwu, 2012).

Present emerging security threats from movements such as the Movement for the Actualization of the Sovereign State of Biafra (MASSOB), and the Independent Peoples of Biafra (IPOB) in the Southeast, Boko Haram and ISWAP in Northeast, and bandit groups operating throughout the North constitute threats to the internal security of Nigeria and potential avenues for a bioterrorism incident in Nigeria.

The radical Islamic sect from northeastern Nigeria, Boko Haram has carried out series of bomb attacks directed at the Nigerian state and its security apparatus, as well as civilians. Most notable was its attack on the U.N. headquarters in Abuja. Currently, bandit groups operating in the north central, and northwestern states are now responsible for large-scale bomb attacks on security and civilian infrastructure, such as the recent bomb attack on the AK9 train and subsequent kidnap and killing of passengers (ChannelsTV, 2022).

Nigeria witnessed a natural biological incident that resulted in famine, when desert locust (*Schistocerca gregaria*) plagues caused significant crop losses in

Northern Nigeria as well as most parts of West Africa resulting in food scarcity (Vallebona, 2008). Nigeria has also experienced incidences of avian flu epidemics. The first of these, recorded in 2006, spread quickly from the index case on a farm in Jaji, Kaduna State, to 25 states in the country. Another case in 2008, involved a pathogenic form of the avian influenza virus.

Although Nigeria has shown significant commitment to complete prohibition of Biological Weapons, being part and parcel of the First Review Conference of State Parties to the Biological Weapons Convention (BWC), in 1980 (Ohiare, 2014), it is however obvious that the nation lacks the capacity to defend itself against threats posed by such weapons, and thus opens opportunities for groups or actors to exploit this area and undermine the security and stability of the nation (Ohiare, 2014).

In his 2002 State of the Union Address, President Bush noted that captured Al Qaeda documents included detailed maps of several U.S. municipal public drinking water systems (Meinhardt, 2004), indicating that public health and welfare systems were potential targets in terrorisms actions. The September 11, 2001 anthrax attacks therefore defined a new role for public health. The attacks showed that a country's first responders, public health professionals, and health care workers are also critical in the national defense and security network (Lederberg, 1999). In response, most western countries have and are developing a bioterrorism emergency framework that synergizes the efforts of health professionals, security services and emergency workers for effective first line response and containment of biological weapon incidents.

Challenges to bioterrorism response in Nigeria

1. Prevention

The prevention of bioterrorist incidents requires a multiagency approach to predict and contain potential impact of dissemination in specific areas. In the US, the Department of Homeland Security (DHS)(created in the wake of the World Trade center bombings), the Pentagon, the Federal Bureau of Investigation, the National Security Agency, monitors potential bioterrorism incidences, specifically tracking activities related to the sale, acquisition, production or diversion of materials necessary for bioterror attacks, and/or biological agents themselves. These agencies also focus on disruption of transaction, possession and deployment of biologic agents by such illegal groups (DHS, 2004). The US bioterrorism response system recognizes that bioterror threats and attacks most likely will originate from radical groups or individuals, with the intent of carnage, and not from legal and functioning entities such as governments or corporations that control the production and trading. One approach to prevent the damage that comes with a bioterror attack is the BioWatch program, where in conjunction with the Environmental Protection Agency

(EPA), the DHS monitors air quality of high risk metropolitan areas for classified biological agents (Hook-Banard et al., 2014), in order to also prevent biological incidents, Nigeria also needs to proactively monitor and restrict access to biological agents and their precursors and monitor industries and processes that have the capability to manufacture potential biological agents.

2. Surveillance

Surveillance mechanisms allow for a delicate balance between investigating and informing the public, so that appropriate measures can be taken while at the same time preventing a public panic. A medical intelligence system (MIS), such as that employed to combat and contain the SARS outbreak in 2003, as well eradicate smallpox have been shown to be useful in monitoring and responding to outbreaks of communicable diseases (Fenner et al., 1988). These systems can used to recognize and detect biological incidences quite early, as well as identify the specific agents.

However, one major challenge in monitoring biological outbreaks is filtering between symptoms of natural infections within a given population and that of a biological attack, such as in infections with viruses, e.g. influenza or the common cold (Pappas et al., 2009). Surveillance, therefore, will usually involve epidemiological investigations upon a confirmed case of a biological incident.

Though the Nigerian health system has recorded repeated outbreaks of infectious disease, practically no attention is given to surveillance systems, except those done under the auspices of international agencies (e.g., WHO, USAID, DFID, etc.). This absence of an adequate MIS poses a serious drawback to any effort at countering biological incidents in Nigeria (McBrien et al., 2010).

However, Nigeria in partnership with the CDC, has set up facilities since 2001, to strengthen laboratory surveillance, and workforce capacity in health institutions, in responding to outbreaks of vaccine-preventable diseases (Welcome, 2011; CDC, 2014).

3. Emergency preparedness

The devastating terrorist attacks of September 11, 2001, led to increase in funding for biological agents-related research efforts (Sell and Watson, 2013). The Bioterrorism Act enacted in 2002 provided funding to the CDC to prepare the US health system for potential release of biological agents (Ziskin and Harris, 2007). A National Preparedness Guidelines released in 2007, by the Federal Emergency Management Agency also established guidelines on response to potential biological incidents (FEMA, 2007).

Preparedness for a potential bioterrorist attack involves the routine review of coordination issues with agencies concerned with response (e.g., emergency

services and local health authorities), and training programs for health providers to increase alertness.

Adefisoye, (2015) has noted that Nigeria, also has a National Disaster Management Framework (NDMF) coordinated by the National Emergency Management Agency (NEMA). This framework has, however, since its introduction not achieved any of its objectives of; delineating responsibilities in cases of emergency, providing efficient institutional capacity or creating efficiency in emergency operations. Factors hampering effective disaster management in Nigeria include; centralization of emergency activities which lead to inefficient service-delivery, and responses to localized emergency situations, as well as insincerity on the part of the government to provide functional emergency services especially at state and local government levels (Welcome, 2011). Gaming simulations have been used to test knowledge and skill of individuals who engage in anti-bioterrorism and show great potential in training emergency responders in developing nations (Olson *et al.*, 2010).

4. *Interagency coordination and communication*

There is need for a clear communication pathway and action plan for security and public health officials in outbreaks of bioterrorist events. Bioterrorism threats pose potential effects against the security agencies who are usually the first responders to any security threat. Law enforcement, intelligence and emergency organizations need to have clear collaboration in partnership with other social welfare and civil organization, as well as the public.

Aliyu (2015) notes that NEMA hardly carries out its role during emergencies with any involvement of physicians. More worrisome are the superiority struggles and interagency conflicts among Nigeria's security agencies. Odoma (2014) has documented the history of interagency feuds among Nigeria's security services. Lack of cooperation and operational confidence will greatly hamper the ability to communicate and coordinate effectively in biological incidents and increase the exposure and casualty rate for first line responders. Untrained and uncoordinated responders may also serve as unwitting transmission agents for biological agents.

Another key area is the sharing and coordinating of information among these organizations. At regular intervals, meetings and trainings may be performed to share information regarding planning responses in collaboration against bioterrorist attacks (Godley, 2003). A health advisory network can be created to coordinate communication between medical health providers, emergency room personnel, infection-control personnel, and infectious-disease personnel in hospitals.

Ibrahim and Saleh, (2018) have suggested a Public Protection Service Commission (PPSC) for the Northeast of Nigeria, serving as an interagency cooperation mechanism for all security services

operating in that theatre, and as a pilot for potential implementation in other parts of the nation.

5. *Detection capability*

The necessity of detection first appeared after the 2001 anthrax spores' attacks in the US (Grundman, 2014). Clinical features of exposure to biological agents are often easily mistaken for symptoms of common tropical diseases encountered daily (Bus and Pleck, 2012). Rapid and accurate detection is necessary to confirm the presence of these agents unambiguously in different ways. Early recognition of the nature of the situation remains key to reducing its mortality and morbidity, identifying appropriate response measures, and curtailing waste of efforts and resources.

For example, Nigeria owes a great debt of gratitude for the quick response and intervention that minimized damage in the 2014 Ebola incident to late Dr. Ameyo Adadevoh. Her ability to quickly suspect hemorrhagic fever in the index patient, Amos Sawyer, send samples for analytical identification and isolate the patient accordingly saved many lives, and helped curtail the spread of the infection. This came from a background of having understood the nature of hemorrhagic infections (Insight Health Consultancy Limited, 2015).

The US CDC has subsequently implemented a "Bioterrorism Preparedness and response program" to familiarize healthcare professionals in the US with warfare agents and ensure capacity to detect and respond to potential biological attacks (Keim and Kaufman, 1999) effectively and efficiently.

The healthcare system in Nigeria therefore needs to.

- i. Begin to include biological agents in differential diagnoses. Health care practitioners need to be trained in the history and evidence indicative of a biological agent attack or exposure. Suspicion in diagnosis must move beyond "common" issues and cover non-conventional causal agents such as bioterror agents.
- ii. Increase the number and capacity of reference laboratories and centers to deal with emerging pathogens. The CDC has enabled the establishment of PCR reference treatment referral centers in Nigeria, however, and going by what was witnessed in the COVID-19 pandemic, there is need for more.
- iii. Be updated on current and global happenings and trends in epidemiology.
- iv. Be knowledgeable about management, treatment and prophylaxis of patients exposed to biological agents.
- v. Make clear channels for the reporting and follow up investigation of suspected biological agent incidences and exposures.

6. *Strategic stockpiling*

Medicines production can play a major role in countering the bioterrorism threat since; antibiotics can be used in a preventive role or treat confirmed cases. Vaccines can be used to minimize the extent of a biological incident, by curtailing interpersonal spread

of the agent involved. To this end, the stockpiling of medication aimed at preventing or treating potential biological incidents is strategic to managing any such incidents that may occur.

The US mandates states to maintain Strategic National Stockpile (SNS), of several facilities with vaccines and antibiotic stocks enough for potentially affected populations (FEMA, 2007), and with capacity to distribute measures to counter any biological incident within 48 hours at an available dispensary. This program run through the Cities Readiness Initiative, is currently available in 72 cities (Esbitt, 2003; Courtney et al., 2009).

Nigeria faces an uphill task, when it comes to strategic stockpiling. Foremost is an absence of an indigenous expertise in the production of countermeasures and medications against potential biowarfare agents. Efforts have been made to promote domestic pharmaceutical production, but Nigeria still imports a major percentage of pharmaceuticals. Other key challenges confronting Nigeria's pharmaceutical sustainability include counterfeit medicines, poor healthcare, drug distribution and storage infrastructure (UNIDO, 2011).

Additionally, not much research or development has been going on in this sector. Only 986 patents were issued to indigenous innovations between 1999 and 2002 out of 2544 applications (Ugba and Okoro, 2017). This reliance on foreign inputs negatively affects the ability to stockpile medicines against biological incidents or maintain production that can meet the needs of such incidents.

The Ebola outbreak of 2018-2019 in the Democratic Republic of Congo presents a good example. By late October 2018 with more than 20,000 people vaccinated, the WHO stated that with the increase in severity and spread of the outbreak (to Uganda as well), the current stockpile of 3,000,000 vaccines may not be enough to contain the outbreak. Sad to say that statement rings through as the crisis continues (WHO, 2018) as it takes several months to make the Zaire EVD vaccine (rVSV ZEBOV).

7. Security and intelligence measures

The continuous occurrence of inter-agency feud has grave implications for the security of the Nigerian state and her people: at the peak of all the security challenges, security operatives are often found helpless, not really knowing what to do (Odoma, 2014). Security responses in emergency incidences tend to follow a heavy-handed approach that exposes first responders to risks. Security responders can therefore serve as unwitting agents of dispersal in bio-attack incidents. The Nigerian security apparatus will need to be empowered in intelligence and predictive actions and enhanced in monitoring and securing the nation's borders. Security services should also be trained on biological attack, threat, prevention, and response

Conclusion

The unpreparedness of Nigeria to deal with potential bioterrorism incidents is evident by various situational reports of the various challenges involved in emergency response and public health. Being prepared is obviously, the best defense against possible events involving such agents. Nigeria needs therefore to be prepared to detect, diagnose, and respond appropriately to civilian bioterrorism threats. The response to bioterrorism incidents necessitates coordinated efforts by various organizations in detection, surveillance, vaccine development and public education, etc. Cooperation and collaboration between both established and foreseeable agencies will contribute to the overall success of any bioterrorism related response.

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