

Assessing the Vulnerabilities of Bioterrorism: A Case Study of Pakistan

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Article History

Received:
October 16, 2023

Revised:
December 18, 2023

Accepted:
December 30, 2023

Published:
January 11, 2024

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Abstract

This study investigates the vulnerabilities and challenges exacerbated by bioterrorism empirically. Terrorists, organizations, and individuals deliberately use biological weapons to kill humans, animals, and plants. According to experts, the threats are multifaceted and have intensified in the modern world, such as 5th generation warfare and health crises. The study is exploratory, employing a qualitative approach to explore the literature, policy documents, and reports released by international and national organizations. In addition, the study integrates the most recent papers published during COVID-19 to investigate the difficulties and potential of bioterrorism. The findings provide a thorough understanding of the expected dangers of bioterrorism, such as threats of theft and attack, threats to utilize biological weapons, which are cost-effective, by terrorist groups, anarchic proliferation across the globe, biological agent manipulation, and so on. During the pandemic COVID-19, several countries, including Pakistan, experienced these risks. Given all of the looming concerns stated above, precautionary actions should be implemented to avoid these threats in the event of a new international bioterror strike in the future.

Keywords: Bioterrorism, vulnerabilities, threats, new diseases, 5th Generation Warfare, COVID-19.

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1. Introduction

Bioterrorism is a fact, and it should be defined as the intentional use of biological weapons by terrorists, groups, and individuals, as well as the body of a state's separate structure, to destroy people, animals, and plants. At the moment, a diverse and cynical type of terrorism can be detected. Terrorists will employ all methods necessary to attain their objectives. Terrorists are employing cutting-edge information and cyber technology in their criminal activities as their material and technological skills grow. The COVID-19 pandemic is a warning sign for preventing bioterrorism, and it will be a major issue in the future (Требін, 2020).

The coronavirus pandemic, also known as COVID-19, had a global impact on public health, social welfare, social psychology, and economic situations. These repercussions caused unprecedented changes and threats all throughout the world. Bioterrorism is a reality, and as such, it has numerous escalating hazards that must be thoroughly investigated in order to counter it in the future. COVID-19 exposed worldwide vulnerabilities and is widely viewed as an event that has the potential to define a generation, with an impact even greater and more widespread than 9/11. Following widespread loss of life, there was a significant shift and economic decline in societal norms. In international relations, the stability between citizens and their governments is shifting as a result of global population expansion, urbanization, and globalization. (Collins, 2020).

There are other risks related with technical and biological advancement, as well as altering health concerns like developing antimicrobial resistance. All of these elements combine to increase the risk outline and complexities associated with terrorism and public health emergencies. Because conventional terrorism is more likely, planning for unconventional terrorism, such as bioterrorism, receives less attention. Because of the disclosed preparation deficiencies, COVID-19 may increase; bioweapons have the potential to be employed as a terrorist technique. Both the UN Secretary-General and the Council of Europe agree on this point. (Townsend-Drake, 2021).

2. Review of Literature

When there are concerns, they have a high likelihood of becoming crises. Both are mutual. The theory of "Issues and crises management" created by Howard Chase, an American expert in Communication Strategies, can be applied to COVID-19. It began as an issue but quickly evolved into a major crisis in Wuhan, China, before spreading to the rest of the world. Major crises must always be managed. Essentially, crises occur as a result of an issue being handled incorrectly (Zamoum and Gorpe, 2018).

In 2019, in Wuhan, China, the leakage of coronavirus from the laboratory, intentionally or unintentionally, spread at a very fast speed and thousands of people were infected due to it and transformed hurriedly into a crisis. Soon, it spread across the whole world and became a global crisis that needed management. That global crisis was tackled after its spread as a result of biowarfare. After this global experiment, more future attacks can be expected. The planners who are controlling the whole world, try to create such a situation which is the source of internal and external threats for almost all the states of the world. This situation needs to counter the bioterrorism strategy or crisis management process (Zhu, Wei, and Niu 2020).

Obeta (2020) explained that there are various agents which have the potential to be used as weapons of bioterrorism among humans as well as animals. Zoonotic and parasitic agents are added to the food and water supplies which causes a variety of illnesses and fear among humans. To predict a bioterrorism attack, diseases in humans and animals must be detected. Bioterror threat agents are usually microbes that are responsible for parasitic and zoonotic diseases such as Ebola, anthrax, hemorrhagic fever Coronavirus, etc. To counter bioterrorism, it is necessary for Governments, antiterrorism bodies, and disease-countering agencies to have a long-sighted vision to be prepared with drugs, vaccines as well and antibodies in case of such bioterrorism attacks. This article gives guidance about the spread of bioterrorism and recommends being prepared for it medically, but it doesn't discuss the political aspects of the crises in human society as well as how to manage it. The present study will bridge up this gap.

Mustafa, Nadeem, and Kakkar (2021) highlighted the reasons for insurgencies,

terrorist attacks and bomb blasts. Pakistan's geographical location as well as its achievement as nuclear power in 1998 are among the main reasons. The 5th generation's warfare has taken place the conventional ways of war now. The hybrid or 5GW waged by the hostile intelligence agencies through media and the internet. The various communities of Pakistan have been utilized to create mistrust among the people and the state of India. The nexus of two anti-Pakistan agencies India's Research and Analysis Wing (RAW) and Afghanistan's National Directorate of Security (NDS) created insurgency in Baluchistan by using Iranian and Afghan soil. Media is being used to create a negative image of Pakistan in the world by propaganda. At present, Pakistan was, in FATF's grey list due to India's false flag operations. Pakistan followed a proper counter-terrorism strategy. The study discussed all the sources of 5th Generation Warfare, but it failed to give a well-balanced strategy to counter fifth-generation warfare along with bioterrorism.

Gillani, Nazir, and Pirzada (2021) described the present era as the 5th Generation Warfare era and this is the most horrible among all the generations of warfare in the past. Any state's internal or external structure, image, and reputation can easily be effected by this warfare. This war is fought by the civilians instead of a professional army. Social media has become part and parcel of most of people's life and through it the 5GW has become very crucial. The creation of fake news and fake scenarios, it has become very easy to change the mindset of the common people. The aggressive behavior and terrorist activities of the political and non-political groups create instability in the country. In this technological era the war has entered into non-conventional ways which are very difficult to counter. India always built narrative against Pakistan and try to blame Pakistan. These all aspects give details about the 5GW through social media used by enemy countries especially India. The counter strategies have not been given in it and the present study will provide the recommendations to tackle this difficult area.

Khan (2021) worked on misinformation and disinformation through propaganda which he described as white Propaganda where origin of info is known and taken as true, Black propaganda where origin is unknown and it spread false info and Grey propaganda where the source is doubted and info is taken as suspected. The history

of it is as old as human being itself. All the generations of warfare are directly connected to misinformation, disinformation as well as all kinds of propaganda. Hybrid warfare is totally dependent upon it. He has taken the Iraq war as a case study. The present study will take Pakistan as a Case study to analyze the situation in the backdrop of COVID 19.

Esen (2022) describes that the COVID-19 epidemic is escalating societal concern and diminishing public confidence in the country's insufficient ability to combat the disease. A social conflict cannot be started by an outbreak on its own. However, pandemic circumstances and state responses may lead to social unrest, bloodshed, and other negative outcomes. In times of crisis, terrorist groups heighten worry, which leads the people to question the legitimacy of the government.

Governments must set up systems to limit the pandemic's economic effects in order to keep citizens engaged in the system. In times of crisis, terrorist organizations prey on specific populations, often minorities and immigrants, and incite violence. The administrations must convey the accurate information since terrorist groups exploit conspiracy theories in this process. Terrorists are attempting to use the pandemic and the virus to further their own goals. However, it is already challenging to predict how COVID-19 would affect the level of terrorism globally over the long term. How to counter the pandemic along with the terrorists is the gap that will be bridged up by the present study.

Dass (2021) highlighted the expected global threat through bioterrorism which is being used by the terrorist groups. The terrorist groups used the world pandemic to promote their networks. The long lasting effect of the virus has been acknowledged by the terrorists as an easy weapon to use. During the modern times, the development of the technology has made it possible to develop biological weapons very easily and cheaply. The bioterrorist incidents started from 1990 as soon as they achieved the capacity of utilizing the bio agents. He further warned to assess the expected threat through the use of biotechnology. Dass has mentioned many aspects but left a gap which can be termed as management during the upcoming crises.

Stock (2020) highlighted a new International Criminal Police Organization - INTERPOL analysis which focuses on the influence of COVID-19 on global

terrorism, trends, and potential hazards related to assaults on vulnerable targets, including bioterrorism. The evaluation in this report related to COVID 19 and terrorists' and other non-state actors' (NSAs') strategy and capabilities are referred to as bioterrorism. As COVID-19 incidents decrease in some areas while increasing in others, the report emphasizes the important necessity to watch the reaction and response of terrorist networks, violent extremist groups, and other potentially harmful non-state actors.

Townsend (2021) described the phenomena of covid-19 in his report as natural potential for the terrorists to materialize the bioterrorism. It is effective and inspirational for the terrorists. Global strategies must be adopted in the cities in case of bioterrorist attacks. The lesser the cost of developing bioweapons, the more vulnerable it is. It brought social, and economic instability and capitalized all forms of terrorism by making clear its destructive power it. Bio threat is old but presently international institutions have recognized as a threat which is complicated, dangerous and increasing at all levels. Many cities are not ready to face that threat. It's the duty of the state as well as citizens as members of the social contract to work together to cope with the upcoming threat i.e. bioterrorism. This report enhanced the overlaps in both responses to crises and preparedness against bioterrorism at local, national and international levels. Many recommendations have been given to respond to bioterrorism in the cities. These are general recommendations for cities not specific, it can be termed as a gap which will be cooped by the present study taking crises & their management in case of any bioterrorist attack in developing countries. Clement (2021) in his report focused on the exposure of global vulnerabilities to biological threats during the COVID-19 pandemic and concentrated on the prospect of purposeful biological assaults. This report's primary focus is on the potential provided by biotechnology and other Emerging and Disruptive Technologies (EDTs), as well as the major concerns posed by biological weapons. The current threat landscape is generally overviewed here. Advancement in recent biotechnology has the ability to fight against the threats of bioterrorism, whether planned or natural pandemics, these advancements are also assisting in the development of increasingly sophisticated biological weapons, owing to convergences between biotechnology

and other Emerging and Disruptive Technologies. The report examines the expected bioterrorism in this context and the possible spread of biological weapons capabilities to non-state entities such as terrorist organizations. Therefore, the COVID-19 pandemic served as a wake-up call to the international community to address the risks posed by biohazards. COVID-19 has increased the risk of biological threats while exposing severe flaws in NATO members' reaction to a large-scale biological threat.

3. Motivation for Bioweapon Program

Because of the pandemic, many technologically advanced countries consider that a biological weapons attack is one of the worst possible outcomes. In an unpredictable security environment, the disruptive potential is one of the most strong deterrents against enemies. This could be because contagious diseases have a negative impact on military operations and society as a whole. Pathogens, especially if they are novel and low virulent, can raise the perceived value of biological weapons. This is because they have the power to cause widespread harm and terror. Biological weapons are becoming more attractive as a low-cost, low-impact alternative to nuclear weapons. A pandemic's potential health dangers are enormous, both in terms of economic and psychological consequences. Given the absence of public health preparedness, this might be disastrous for a large number of individuals. The disparity in how much people in various countries gain from technology is referred to as its asymmetric utility. As evidenced by COVID-19 statistics, this notion has evolved dramatically over time. A pandemic/widespread sickness that affects a large number of people. Furthermore, biological weapons are viewed as a powerful instrument for hybrid warfare and targeted attacks. By 2026, the rhetoric surrounding biological weapons resembled that of the Cold War. Despite the differences between nuclear and biological weapons, many of the same worries have returned.

Biological weapons have long been thought to be particularly useful for assassination. A few countries are currently suspected of exploring this form of weapon, though it is unclear how far they have progressed. Unidentified parties are likely to deploy these toxins on a modest scale in addition to the countries suspected of possessing biological weapons. Such applications could include targeted attacks and killings. Governments

prepared for the pandemic by developing BWC-related activities and forums. The vast majority of countries regard these forums as critical tools for international collaboration. The term "broken" is frequently used to characterize countries or persons who have seen their status deteriorate. These countries and people are seen as being weak, unable to solve problems, and generally not worth mentioning. The failure of international cooperation is partially due to the breakdown in diplomatic channels and this breakdown gives the weak edge to experience bioterrorism on these people. During the COVID-19 era, there were many motivations for biological weapons programs which included (i) offensive use as an asymmetric and covert tool, (ii) assassination tool, (iii) World Health Organization (WHO) also planned to deter adversaries, (iv) Weaknesses compared to traditional strengths of opponents, (v) Demographic or racial targeting tools. Moreover, during the COVID-19 top driver for bio-weapons programs were many such as (i) To deny, (ii) Psychological impact, (iii) Extant potential harm (e.g. deaths, casualties), (iv) Easy to hide, (v) Accessibility.

Where there were many motivations and top drivers for bioweapon programs during the COVID-19 era, some top inhibitors were also present to stop all the bio-weapon programs. These include (i) fear of retaliation, (ii) legal and moral constraints, (iii) difficulty of control after the release of a pathogen, (iv) Risk of detection, and (v) Indiscriminate nature.

4. Vulnerabilities/Threats due to Bioterrorism

On the global level, the vulnerabilities have been unveiled by bioterrorism. The accelerated threats due to Bioterrorism at present can be described below.

4.1. Threat of Theft

All those facilities that possibly have dangerous toxins, bacteria, and viruses, often are being saved Non-professionally and this increases the risk of leakage, accident, or theft (Jenkins, 2017). At present, almost 59 Bio Security Level 4 Laboratories (BSL-4) are working in 23 countries of the world. Europe has most of these BSL-4 labs, followed by North America and Asia. These Labs are mostly located in urban areas. In the above-mentioned Labs, highly infectious Pathogens which still lack treatment,

are studied. Despite this, only one-fourth of the countries that host the above-mentioned facilities, maintain the highest level of biosafety and biosecurity (Green, et, al, 2019). Almost all the countries have to report their labs according to the BTWC but most of these labs are unable to follow all the protocols prescribed for safety (Warrell, 2021).

There is currently no authoritative international standard-setting safe work standards for BSL-4 facilities, and the ISO voluntary biohazard management standard launched in 2019 has not yet been signed. besides this, there is no international check and balance over these laboratories strictly attached to the WHO biosecurity guidelines and national protection. It is observable that after COVID-19 countries are trying to enhance their preparedness for the pandemic and the BSL-4 labs are increasing in number. On the other hand, the lower level biosafety labs (BSL-3, 2) increase their research for the protection of the future as well as to counter the risks of security.

Many experts including terrorism scholar Andrew Silke raised a warning related to the Pandemic COVID-19 that it can bring the attention of the terrorists to use it as a weapon for terrorism. To some extent, it is owing to the destructive repercussion of COVID-19 along with its potentiality of far-reaching results of a bioterror attack which involves a biological agent of novel type (Silke, 2020, p.12). The fact should be considered that the various research laboratories including BSL 3 (P3) or BSL 4 (P4) may have the possible leakage of pathogens and have the ability to be used to develop as a biological weapon and this can be a great threat to the human beings or humanity (Cyranski, 2017, p. 400).

4.2. Threat of Attack

Experts are worried about the economic, social, and destructive sides of bioterrorism. The crises also have drawn attention to its potential for terrorists to be used as bioterrorism. These fears have been fueled by reports that extremist groups have called for them and their followers to intentionally spread COVID-19 to targeted individuals through coughing or otherwise. In the United States, at least two persons have already been charged with terrorism after alleging that they were purposefully attempting to spread the virus (Silke, 2020).

The Secretary-General of the United Nations raised a warning in April 2020 that “This

pandemic's flaws and lack of preparedness provide a glimpse into how a bioterrorist strike can unfold - and may enhance its risks" (United N. 2020). COVID-19 has helped to experience those circumstances which forced me to prepare in a better way against all kinds of risks and threats which include terrorism as well as public health. In the Middle East MENA Region, and North Africa, ISIS-affiliated groups and conspiracy theories have also spread by Al-Qaeda that claim the COVID-19 virus as "Soldier of GOD" the enemies of Islam are being punished by it.

Dr. Boyle, who spoke about the Wuhan coronavirus outbreak and the Biosafety Level 4 Laboratory (BSL-4), was referred to by Skopec. According to him, the virus is potentially lethal and could be used as a dual-purpose bio-warfare agent with the ability to gain function, because of this, the Chinese government, at first, tried to conceal it. The pathogen 2019-CoV is most likely a weaponized variant of the NCoV, which Saudi doctors first discovered in 2012. The mainstream media continues to believe that COVID-19 originated at Wuhan Seafood Market. India has launched a thorough investigation into China's Wuhan Institute of Virology. A study on bats and people with antibodies to lethal viruses such as Ebola was conducted in the northeastern province of Nagaland (near China). The Wuhan outbreak must be investigated. The current study will fill the gap in understanding how to counteract this biological weapon. These types of labs have a great risk of theft and latter to be used as agents as bioweapons (Skopec, 2020, p. 1,2).

4.3. Threat of use in the hands of Terrorists

It is very necessary to have distinct intent and capability. For long, terrorists and terrorist groups have had great intentions for obtaining weapons that have the capacity to create great harm. The terrorist threat is real and the organizations of terrorists will, in no way, back down. The idea of bioterrorism can be applied through a very small group without coming to the notice of others. All the types of groups may be independent or state-affiliated and the use of bioterrorism by them will be disastrous and can contaminate food, water, and air including infrastructure and industries. In her excellent book, Audrey has pointed out that human beings are living in the age of empowerment which is more lethal in comparison to all the ages of human history and the present weapons can cause far-reaching effects and consequences. (Cronin, 2002).

In the past, according to many documented proofs, the biological agents used by the terrorists were not very successful. A sectarian group in the United States in 1984, intentionally contaminated a restaurant's greens bars accompanying the Salmonella typhimurium, with the intention of stopping the people who were ready to vote in Dalles Oregon. The attack developed in hundreds of cases of salmonellosis but eventually, there was zero death. (Green et al., 2019, p. 2). The apocalyptic religious sect cult Aum Shinrikyo, in Japan, had experimented with biological agents which remained unsuccessful. It was in the early 1990s before the start of using chemical agents. They released the nerve agent sarin in 1995, in the Tokyo subway system which killed 13 people and 5500 were injured. Since World War 2 (WWII), poisonous weapons remained associated with the secret services. An exiled writer George Markov was assassinated by the Bulgarian secret police in September 1978 and the weapon of assassination was a ricin-laced pellet. The Soviet KGB-run Laboratory 12 was considered the source of the toxin which was thought to be quick, quiet and efficient in killing especially (Zanders, 1999).

Biological weapons could be obtained by terrorists in various ways. First of all, they could take natural samples of pathogens i.e. Bacillus anthrax or Yersinia pestis and by culturing these agents, they can cause plague and anthrax. Secondly, they are competent enough to combine the agents themselves by using the various resources which include manual or online. The skill set required to successfully wield these techniques has steadily decreased and may soon resemble the straightforward process of using a cookbook (Dass, 2021). Thirdly, the terrorists or non-state actors can acquire biological agents or toxins through proper channels or permissible ways such as medical supply companies or culture collection centers. Finally, the agents or toxins could be stolen by the terrorists from the research centers or medical laboratories. they could exploit the conduct of research with the help of those people who are authorized to approach the facilities where their required materials are deposited (Alleslev, 2021).

4.4. Threat of Misuse Due to Less Cost

Advancements in scientific technologies do not exclusively enlarge or expand the chances at diminishing side rather they can make it possible to reach current natural lookup or technologies. Usually, precise knowledge is essential to process, produce,

or spread the biological agents but in microbiological processes, the manipulation has become very easy and speedily becoming less costly. For instance, at present, in a house, the latest facility for Deoxyribonucleic acid (DNA) synthesis is possible to build and a shipping container's measurement is enough for that house. (World Economic Forum 2019).

Pathogen expertise has increased in parallel. Records on the complete genomes and coding sequences of organic organisms are now publically accessible in web databases such as GenBank, the Ensemble task, and the Viral Genome Resource (E F., Sinning, Bontje, Frattina, & Abdalla, 2017).

In 2016, a group of Canadian researchers were able to use a method that also could be used to create smallpox from scratch, a deadly member of the pox virus family that was eliminated worldwide during 1980s, to recreate the horse pox virus, which had long since died out and it will not be possible again (Kupferschmidt,2017).

4.5. Threat of Proliferation

Widespread proliferation of knowledge and technology manipulates biological agents among terrorist groups. The easy access to this information give them a chance to use it frequently through various tactics. Biological weapons will likely be used in the future. One reason for this is that non-state actors are not currently restricted from accessing and using these types of weapons, especially on a large scale. They will need essential competence to approach the technical equipment and funding to be able to do it (Lentzos, 2020). The threat of terrorist attack is reality and the chances of its growing worse are its peak. In order to carry out a terrorist attack, terrorists must first acquire or produce a suitable explosive agent, then to segregate it securely and find a fruitful way to transfer it to its target (Block, 2001).

Additionally, terrorist groups may struggle to create biological agents due to their organized structure and uniform ideology. A Biological Program, for instance, will be easier to establish for a vertically integrated group than a loosely structured group with little centralization (Alleslev, 2021)

Pathogens that have been designed to be transmissible or virulent have the potential to cause the most significant biological events, including global biological risks that could result in a catastrophic event, biosecurity threats may be particularly troubling.

Leaders in global health security have also warned that the COVID-19 pandemic may encourage evildoers and raise the risk of intentional biological events, also known as biosecurity risks. (Musunuri et al., 2021).

4.6. Threat of Manipulation the biological agents

Due to the dual-use nature of biotechnology and other life sciences, they can be used peacefully for medical and protective uses, but they can also be turned into complex uses arms. In fact, the latest development in biotechnology research may help to manipulate Pathogens and make them even more targeted weapons. The advanced DNA Sequencing technology has made it increasingly simple to genetically engineer viruses and other organisms that cause diseases. Their host range, transmissibility, and resistance to therapeutic intervention may all rise as a result. In addition, pathogens that once existed can be recreated, or entirely new ones can be created from scratch. These technological advances and the lower cost of synthesis of bioactive substances develop the risk of using unknown bioactive substance Agents that could become weapons in the future and their journey to develop new biologics agents of war starts (Alleslev, 2021).

These pathogens can cause high levels of mortality and morbidity, rendering large numbers of people unable to work in a short period of time. Biological Weapon (BW) agents can be used covertly or overtly and differ from conventional weapons in several unique ways. These drugs do not take effect immediately and require hours to weeks (latent period) before symptoms appear in the affected population (Musunuri et al., 2021).

4.7. Online threats during COVID-19

When assessing the interaction between terrorism and the pandemic of COVID-19, short-, medium- and long-term consequences must be considered. Terrorist groups are preparing for the post-pandemic era through propaganda and recruitment campaigns. Terrorist groups use the Internet and social media extensively in their recruitment activities. Terrorist groups also fuel social fear and anxiety through social media.

4.8. Threat of using /used vaccinations with disastrous consequences

The COVID-19 vaccine could have disastrous consequences. New chronic adverse events as a result of the presence or induction of the spike protein, which is allegedly

a biological weapon. Changes in the amino acid sequence, entry pathways, acquisitions, co-administration, and placement with adjuvants or other excipients are all linked to the spike protein.

Other infections' spike proteins (adenovirus immunization vectors) may cause more extreme or potentially incurable sickness than normal Coronavirus disease. There are also risks from excretion and potential animal contamination during the supply of food. The following list of potential dangers points to the premature marketing and regulatory approval of COVID-19 vaccines (Classen, 2021).

A vaccine against COVID-19 is administered by injecting purified genetically engineered spike protein. This approach comes with several long-term risks, including the possibility of autoimmune disease. According to one author, the spike protein's coded sequences of amino acids are identical in sequences that are found in human proteins, along with all proteins in the CNS. Vaccines against group A which include beta-hemolytic streptococcus, have failed historically because the same autoimmune disease was caused by infection which is wild type. Another risk is that autoimmunity can be triggered by exposure to the epitopes present in the spike protein. Beta hemolytic streptococcus vaccines (Group A) have failed traditionally because the same autoimmune disease can be caused by infections of wild type (Lyons-Weiler, 2020). Prion diseases occur when abnormal prion protein, which is found on the surface of many cells, clumps in the brain and causes damage. Memory loss, personality shifts, and difficulty moving can all result from abnormal protein accumulation in the brain.

The main concern is with those Vaccines for COVID-19 which contain spike proteins as it has the potential to cause prion disease is present. In the virus-causing COVID-19 spike protein, Tetz and Tetz discovered a prion region that is absent from spike proteins from other coronaviruses. The spike protein may theoretically result in the formation of additional prion molecules. Many people believe that the COVID-19 outbreak was caused by a viral bioweapon. Protein spikes and their DNA sequence are complex weapons, and the vaccines approved for COVID-19 may contain spike or code for them. This is a worry because all of them were created before we knew there was a risk involved with protein spikes. It's doubtful that this concern was taken

into account when developing and marketing the vaccines.

The vaccines that are based on protein are dangerous due to use of latest Nanotechnology in it. Some of the brand new purified spike protein COVID-19 have small nanoparticles. These particles have a greater likelihood of crossing the blood-brain barrier. Large particles are prevented from entering the brain by the blood-brain barrier. Nanotechnology has recently been utilized to effectively cross the blood-cerebrum obstruction. It is feared that the vaccine nanotechnology will increase spike protein penetration into the brain, resulting in long-term neurological damage.

The potential risks of an adenoviral vector vaccine against COVID-19 are similar to those of mRNA and protein-based vaccines, rather than being unique. The three ratified and sanctioned adenovirus COVID-19 vaccines are the Johnson & Johnson vaccine, the AstraZeneca vaccine, and the Russian Sputnik-V vaccine. These vaccines are created using adenovirus strains that have the DNA sequence. The spike protein was introduced into the adenovirus genome, and replication-required genes were deleted.

A COVID-19 vaccine that contains or encodes a little-known spike protein with only safety data for a few months is highly dangerous to use worldwide. This vaccination policy could result in disastrous outcomes. The strategy of putting up a Coronavirus immunization for sale to the public is even more heartless considering the way that many accept the Coronavirus episode is the consequence of a viral bioweapon, and the antibody contains the critical element of the supposed bioweapon, the des Spike protein! (Classen, 2021, p. 5)

4.9. Threat of increasing health crises

The lens of traditional realism in connection to COVID-19 is not enough to see through, it is rather an endanger to human security and a great challenge to the public health system. Whenever there is a bioterror attack in the shape of a disease like COVID-19 which turned into a pandemic and appears to be a risk transforming into a health crisis. Bioterror attacks to spread diseases among human beings transformed into a pandemic/crisis due to the misinformation spread among the masses and the misinformation creates mistrust and fear among the people. The fear that was created during the COVID-19 affected the people psychologically and lots of people faced

death only due to the psychological war waged by those who experienced bioterror attacks. The case study of COVID-19 makes it clear that the risk of health crises manifolds in case of any bioterror attack and needs great effort to control in the future.

4.10. Threat of increasing fraudulent cases

The world observed the unmatched global shock during the COVID-19. This situation was enhanced by the fraudulent activities/scammers. The vulnerabilities of the pandemic were regarded as an opportunity to exploit those people who were already suffering from fear and psychological issues. Only the victims in the USA were over 671868- from January 1, 2020, to January 19, 2022, and the complaints related to fraud had total loss of \$ 669.7 million. Various kinds of frauds such as identity theft, theft related to online shopping, investments, mortgage, credit cards, travel tax, etc. Most of the people adopt it as their duty but some of the persons do not accept it rather they have raise anti-government attitude which is the source of problems for the Govt. financing insurance etc. (Zhang et al., 2022). The same was the situation in other countries of the world and in future, in case of any bioterror attack, the risk of these type of fraudulent case will be very much present and it can transform the pandemic into great crisis. When a pandemic transforms into crisis, it becomes out of control.

4.11. Threat of rising anti Government attitude

Disasters are very common for human being for centuries and they are living with them. The modern world has new rules and regulations related to all types of situations, whenever there is a pandemic/crisis WHO or all ministries of health in all the countries make regulations related to new pandemics, and the people are bound to obey the rules according to the laws of a particular country. During COVID-19 almost all the Governments of the world made vaccination compulsory for everyone but in many countries, many people were not ready to take vaccination without having a disease and they started raising voices against their governments. So, in the future, in case of any other bioterrorism act, and as a result the spread of any new disease can lead the people towards an anti-government attitude by declining to accept any instructions from their govt.

4.12. Fifth Generation warfare

According to an ex-US army general, they use various strategies in 5GW. It is referred as the triple C formula, which stands for convinced, confused, and conflict. Their primary objective in this endeavor has always been to increase our own curiosity. They devise strategies and target the citizens of those countries. They ensured that those with national significance were chosen and that those with common public concerns were produced. They also work on the weaknesses and vacuums because they are always an easy target. They make leaders and people follow, and no one knows what kind of agenda is at work. This has happened various times, and they have consistently met their goals.

The youthful generation is always the primary target in this fight. Nowadays, every young person, above all students, uses an Android and has internet access. Their outlook on life and their roles as leaders are filled with ideals. Everyone feels a connection to someone. In a matter of minutes, the information they access via Facebook, WhatsApp, and Twitter spreads and becomes established. In combat of the fifth generation, these extraordinary weapons are utilized. During the pandemic COVID-19 5GW was used to spread misinformation and disinformation related to the pandemic and it transformed the situation from bad to verse.

Conclusion

In this paper, the vulnerabilities/ threats due to bioterrorism have been discussed in detail. All the above-mentioned vulnerabilities in this paper can be controlled by taking precautionary measures. As a result, it uncovered many threats that were faced due to bioterrorism and are expected in case of any new bioterror attack. COVID-19 started as an issue and soon converted into a crisis and all the crises need to be managed. The management of any crisis is only possible when we know the vulnerabilities beforehand. The expected vulnerabilities/ threats of bioterrorism are threats to theft, threats to attack, threats to use by terrorist groups, threats to misuse due to less cost, threat of proliferation, threats to manipulation the biological agents, threats during online usage, threat of various diseases, threat of increasing health crises, threat to increase fraudulent cases, threat to increase anti-governmental attitudes and above all the fifth generation warfare. All these threats had been faced

by many of the countries including Pakistan during the pandemic COVID-19. In the light of all the impending threats mentioned above, precautionary measures should be taken to avoid these threats in case of any new worldwide bioterror attack in future.

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