

PRIORITIZING THE DEFENCE AGAINST BIOLOGICAL THREATS: PAKISTAN'S RESPONSE AND PREPAREDNESS

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Abstract

Biological threats pose significant risks to national and international security. A deliberate release of biological agents whether by terrorist groups or individual perpetrators constitutes an immediate threat to the life and health of the people. Many biological agents can spread infectious diseases or cause illness in humans. In the 21st century, infectious diseases are the second leading cause of death worldwide. Additionally, the COVID-19 pandemic highlights the unsettled problems in the arena of biosecurity and health security. Moreover, the rapid development of biotechnology leads to an increased threat of biological weapons. Therefore, this article articulates how a state can effectively protect the health and life of its citizens from these threats. The main objective of this paper is to encapsulate the perilous weaknesses in existing preparedness for countering biological risks. Similarly, it explores the policies and capabilities of Pakistan for tackling the growing biological threats. Finally, this paper explores the severe gaps in policy for countering biological risks, particularly in Pakistan.

Keywords: Biological Threat, Biological Warfare, Policy Measures, Counterstrategy, Public Health.

Introduction

Biological threats are a new dimension of security concern in the contemporary era. The danger of proliferation of biological weapons and biological terrorism is overgrowing because of the rapid development of biotechnology. Moreover, the misuse of biological weapons has increased worldwide, especially in the aftermath of anthrax attacks in the US. Biological weapons are considered to be Weapons of Mass Destruction (WMD) and have a high potential devastating effect. These weapons can be used by terrorists as a means of threat, violence and coercion against humans, animals, or plants. The biological agents or biological weapons are not an invention of the high-tech age since these weapons have a long history. As emerging biological risks have catastrophic consequences for a state's health system, security and economic stability, therefore, humanitarian perspective has prevailed in the security discourse that attaches great importance to public health.

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The use of biological weapons has a long history and goes back to the earlier period of humanity. Furthermore, biological agents' risk holds the possibility that terrorist groups may employ biological agents. There is also a fear of accidental outbreaks or natural occurrences of diseases from biological agents.¹ Biological agents are exceedingly infectious bacteria, viruses and pathogenic organisms. Indeed, pandemic infections with the cross-border or global outbreak of infectious diseases can threaten the entire world population. Biological weapons pose risk to both the attackers and the victims since these weapons are not able to differentiate between them. Deliberate dissemination of germs and the natural outbreaks cause high death rates among animals, plants, or people.² Terrorist groups can spread toxins, bacteria and viruses through different means, such as food contamination, sprays, water, or as aerosols in wet or dry formulations.³

There are currently around 200 viruses or bacteria that can be used as weapons. In the context of the Severe Acute Respiratory Syndrome (SARS) crisis, the international community has formally described the situation as a global health crisis. The SARS crisis has influenced the biosecurity policies of western countries. The novel coronavirus (COVID-19) is a new type of viral pneumonia that belongs to a similar family of infections as Middle East Respiratory Syndrome (MERS) and SARS. So far, the allegations that COVID-19 is the outcome of the biological weapons have been limited. COVID-19 is swiftly spreading at the global level which gives momentum to the issue of biosecurity, health security and monitoring of biological risks.⁴ The cases of outbreaks of coronavirus occurred in Wuhan in December 2019 and January 2020.⁵

Shah Zeb argues that biological agents "diagnosis can be performed or handled in only reference laboratories, such as BSL-4."⁶ Since January 2018, BSL-4 laboratory, such as Wuhan National Biosafety Laboratory has been working for global scientific research for the detection of pathogens.⁷ Furthermore, China also fortifies its connections with countries in the arena of laboratory biosafety and the "One Health" concept.⁸ Yet, high-priority biological agents can be easily spread and significantly cause massive fatality.

The spread of biological risks has triggered one of the most significant security concerns. The emergence of zoonotic diseases like Crimean-Congo haemorrhagic fever, chikungunya, and Nipah virus is a substantial challenge in South Asian countries, especially, Nipah virus outbursts in India and Bangladesh had a high casualty rate, nearly 70%.⁹ South Asian countries are needed to transform their policies to strengthen public health systems so that new-fangled forces would strengthen their capacity to respond to any infectious or zoonotic diseases. For example, India has deficiencies in the public health system for countering biological threats.¹⁰ Therefore, disease surveillance and political and public awareness against a biological threat are essential policy tools that can restrain the biological threat in the South Asian countries. The incident of anthrax-laden letters and the most recent outbreak of coronavirus exposed numerous flaws in the current strategies of countering the biological risks.¹¹ The biological risks and events are increasing, particularly, after the end of the Cold War. Furthermore, states must address these threats by empowering the response by

preparation, threat reduction programs, and rising remediation plans.¹² Biological weapons in the past generally remain overshadowed because of chemical and nuclear weapons.

The readiness and control against the spread of biological weapons are puzzling and it is also difficult to identify proper literature for such a study. Most of the contemporary literature is based on scientific considerations and the history of biological weapons expansion. However, numerous authors have filled many of the gaps in the historical use of biological weapons. The number of books published on biological warfare and biological weapons, for example, Jeanne Guillemin's "Biological Weapon: From the Invention of State-Sponsored Programs to Contemporary Bioterrorism," or Judith Miller's "Germs". The notion of an international regime for the prohibition of biological weapons is not frequently mentioned in the literature. The threat of a pandemic infectious disease continues to hang over security and stability at the global level. Thus, biosecurity plays a significant role in avoiding the crisis like COVID-19. Broadly, the notion of biosecurity relates to countermeasures and the prevention of diseases. This paper, therefore, emphasizes the interconnection of international relations with the sphere of natural sciences and also discovers the policies and capabilities of Pakistan for countering the growing biological risks.

Biological Agents' Hazards

Biological agents have unique risks and offensive capability as fundamentally different from other weapons like nuclear or chemical weapons.¹³ Most potential biological agents are natural substances or living microorganisms (pathogens). In the contemporary era, sophisticated bacteriological techniques and availability of low-cost biological agents have originated as the highest threat to human lives. Consequently, biological agents' threat exceeds the chemical and nuclear weapons threats.¹⁴ The detection of biological agents requires hours, usually days or even weeks to cause fatalities as compared to chemical and nuclear weapons that initiate instant casualties. Hence, it is probable that they possibly are changed to enlarge their capability to ground sickness. Pathogens are invisible, replicate in the prey, and can mark fatal, contagious, and disfiguring symptoms. Toxin agents vary in effect from disabling to deadly and often need only very small counts to generate enormous harm.

The Centers for Disease Control and Prevention (CDC) classify biological agents in accord with the risk they pose to the public. Category A agents pose the chief risk to public health. They can be easily spread and could result in high mortality rates.¹⁵ According to the classification of CDC, Category B biological agents pose a moderate risk to public health.¹⁶ These agents can be increased with some easiness and can cause a reasonable degree of sickness. Still, mortalities owing to these infections are typically low. Category C agents include emerging pathogens that could be modified and employed as a weapon because these are easily accessible. Category C agents have the potential to constitute an immense impact¹⁷ and this category includes Crimean-Congo Hemorrhagic Fever virus, avian influenza, yellow fever and SARS-associated coronavirus (SARS-CoV).¹⁸

Origin and Overview of Biological Threats

Biological threat is not a new occurrence as biological agents have been used as a means of weapons for centuries.¹⁹ Usage of these biological agents dates back to approximately 400 BC when the Scythian contaminated and infected arrows with decomposing human by-products to injure their enemies in battle. Consequently, biological agents' threats have their origins in ancient periods when the practical applications of using biologically active agents on the battlefield were recognized. Biological agents and toxins are living organisms, existing in nature and available in a variety of forms like viruses, bacteria, and rickettsia (bacteria that can live inside host cells).²⁰ These agents usually originate in a natural environment but there is a potential possibility that they might be transformed to increase their capacity to produce disease.

There is an extensive history of nations and peoples utilizing biological agents as weapons. In the 15th century during Pizarro's defeat to South America, Pizarro upgraded his probabilities of winning by donating clothing as gifts to the natives which were fully contaminated with the variola virus.²¹ In 1763, Pittsburgh Captain Ecuyer under the guise of friendship presented blankets and handkerchiefs to the Native Americans, who were infected with smallpox. During Indian and French wars, it was assumed that British armies distributed smallpox blankets to native American Indians, who were trustworthy to the French. In World War II, Germans used anthrax against US soldiers' horses. Rajneesh cult, in 1984, used Salmonella Typhimurium for poisoning the salad bars of approximately ten native restaurants.²² Hence, Rajneesh cult contamination of salad bars caused the most significant casualties; around 751 people became sick because of deliberate poisoning attacks.²³

Countering Biological Threats

The risks of the expulsion of biological agents threaten a nation or influence a government which is usually referred to as an intentional explosion of the biological outbreak and also referred to as "the poor man's nuclear bomb."²⁴ Historically, epidemics and pandemics of infectious diseases have caused more deaths than wars. Since deliberate anthrax outbreaks and occurrence of SARS, smallpox, Ebola, or COVID-19 made the states conscious that the public health system is not prepared to administer in a large-scale emergency.²⁵ Referring to the historical approach, it is fundamental to accurately establish the context in which health has become a security issue. A biological outbreak poses an exceptional challenge to therapeutic care and the public health system.²⁶ Unlike an outburst or chemical attack which causes instantaneous and visible tragedies, the public health impact of biological threats can disclose gradually over time.²⁷ Until an adequate number of people appear at emergency rooms and doctors' offices complaining of the same indications, there could be no symptom that an attack has happened.

A nation's capability to counter a biological outbreak depends significantly on the condition of preparedness of its therapeutic care system and public health infrastructure.²⁸ Biological agents' threat is a bigger danger to public health and security; as a result, biodefense being a policy tool is transforming and transmitting

resources to prepare for counter biological threats at all levels.²⁹ Biodefense policy includes measures to detect, prevent, recover, and respond from damage or destruction caused by biological toxins to animals, human health, or the food supply.³⁰ Biodefense policy provides a framework for threat surveillance, prevention, awareness, protection, and recovery.³¹ It performs different tasks for the investigation of the threat, particularly, providing attack warnings, planning, and medical countermeasures.³²

Biodefense is defined as the development of capabilities and knowledge to assess, detect, monitor, respond to and attribute biological threats. Furthermore, for countering the epidemic or biological risks, the US government has adopted the National Biodefense Strategy and Implementation Plan in 2018.³³ The US also focuses on the National Counterterrorism Strategy and the National Defense Strategy. Indeed, the US government is also employing the National Counter WMD Strategy. Moreover, she is making a Global Health Security Strategy and Global Health Security Agenda (GHSA) of 2024 to counter all kinds of epidemics or potential biological risks. GHSA addresses gaps in public health decision-making, significant advancement, investigation of infectious diseases, and disease prevention.³⁴

Measures, such as threat investigation, attack warning, bio-surveillance, infrastructure protection, research cooperation, diagnostics and medical counter measures enhance guidance on preventing biological threats. These approaches aim to reduce the consequences of an attack, afford earlier detection and reduce vulnerability. Besides, biological weapons are a means of extraordinary psychological effectiveness. The possibility of an attack generates fears or panics the population that exerts pressure on political and military leaders and changed strategic thinking. The biological weapons have an enormous potential for damage per weight and volume and relatively easy to secretly produce, transport and use, aware that they may become instruments of state or non-state terrorism, intimidation or retaliation policy. A successful bioterrorist attack or natural outburst of biological agents is the greatest challenge for public health. The health system and the regulatory authorities are burdened to the brim of their capacity and in extreme cases, could threaten in the form of panic, mass escape, looting and finally, the collapse of public order. Generally, the primary cluster of countering biological threats consists of four essential policy tools. These policy tools are to be connected with threat surveillance, prevention, awareness, protection, and recovery.³⁵ The dynamic policy tools against biological threats are Threat Awareness, Prevention and Protection, Surveillance and Detection, and Response and Recovery.

Threat Awareness

Intelligence communities produce an upheaval that creates new opportunities for integrating efforts to recognize new scientific tendencies. Consequently, intelligence communities are engaged in establishing new research and investigating understanding of the risk created by biological agents.³⁶ Thus, the involvement of agencies is an important policy tool to work together to increase the capability of law enforcement, public health, agricultural, diplomatic, defense and carrying infrastructures to identify and tackle such threats and to control rising biological threats.³⁷

Prevention and Protection

Biodefense policy, in the 21st century, is an effective approach and preventing measures for countering biological threats.³⁸ A biodefense policy to counter the Weapons of Mass Destruction places a unique emphasis on the necessity for proactive steps to tackle threats. Deterrence needs the persistence and development of current multilateral agreements to limit the access of lethal biological agents, knowledge, groups, or individuals pursuing to produce, grow, and use these agents.³⁹ Additionally, the involvement of intelligence agencies holds a remarkable position in the public health sector for curbing the biological threats timely.

Surveillance and Detection

Early caution and detection of biological agent's outbreaks permit appropriate response to moderate their outcome is a fundamental factor of biodefense policy.⁴⁰ Deterrence is a policy that is the historical foundation of defense and uncovering covert attacks through defensive and protective measures. On the other hand, biological attacks are hidden or concealed that may allow the performer to remain unidentified.⁴¹

Response and Recovery

A nation requires continuous research for preventing, analyzing and treating a variety of infectious diseases medically, psychologically, and economically.⁴² In response to a disaster, measures are taken to repair or improve the circumstances of a community. The biological weapons are, therefore, contingent on pre-attack preparedness and planning, medical countermeasures, measurement to treat fatalities, risk infrastructures, substantial control measures and refinement of capacities.⁴³ Fundamental capacities for reaction and improvement against biological attacks are based on developments and reasonable threat assessments.⁴⁴

Gaps and Deficiencies in the Current Global Policy

Severe weaknesses in current preparedness competencies offer an overview of existing policy edges to address these critical deficiencies and expand the implementation challenges that lie in the future. The following are a series of essential gaps that need to be addressed to ensure that the population is adequately protected from biological outbreaks.

- **Developing Communication Policy:** The incidents of anthrax-attack revealed enormously tricky-troubles for public health departments, whereas, communication and harmonization being mainly hard. These attacks demand rapid harmonization between local, state, and federal public health societies on technical concerns that developed quickly – the barrier of communication associated with the various complex scientific issues that necessitated new collaborations to tackle problems. Mainly, health care professionals rely on CDC for the response to technical-

scientific queries during the disaster. The communication challenges are connected to issues of sending information.

- **Increasing Public Health Labor Force:** Nation's capability to plan for and respond to bioterrorism or attack rests mainly in states' public health systems. States must reconstruct many components of the public health infrastructure, enlarge their conventional focus to include the threat of bioterrorism and organize endeavors across various levels of government. Moreover, the need for enough well-trained skilled persons equipped to offer proper diagnosis, therapy, and prophylaxis is essential.

Pakistan's Policy and Preparedness against Biological Threat

The proliferation of biological threats has become one of the most significant security concerns in Pakistan. Pakistan has gaps in the current policy to tackle broader issues related to rising biological threats. The broadening vision of policy transformation requires management and public health preparedness for countering biological threats.⁴⁵ For achieving security against biological threats in Pakistan, the most effective tool for countering these threats is the proper implementation of laws and policies. The laws and policies of proper implementation have adequate safeguards to prevent biological threats. Therefore, limiting the biological threats requires raising awareness among the science community, law enforcement agencies, policymakers and health regulatory agencies in Pakistan. Pakistan is working on laws, policies and building up a national framework for biosafety as well as increasing disease surveillance policy which covers up timely tracking of the public health system and controls the dangerous pathogens in Pakistan. Pakistan has also established a strategic framework for the systematic collection, interpretation, analysis, and distribution of health data.

International Policies and Laws to Counter Biological Threats

International and national laws are crucial components to counter biological threats. The foremost measures and laws to counter biological threats were taken in the Hague Conference in 1899.⁴⁶ The main prohibitions to avoid and control the use of poisonous substances and biological agents were regulated clearly under Article 23 of the Hague Convention.⁴⁷ In 1925, Geneva Protocol was signed; it only banned the use of biological agents and poisonous substances as weapons but not their stockpiling and development. However, Geneva Protocol clearly explained that the use of diseases and biological agents in the war would be illegal as stated by international provisions.⁴⁸

The 1972 Biological Weapons Convention (BWC), which was based on the 1925-Geneva Protocol, stimulated the international community to approve the Convention. Initially, 100 countries gave their endorsement, and afterward, many countries (more than 172 including Pakistan) endorsed the BWC. The BWC is the first multilateral disarmament international and legal banning treaty that condemns the development of the entire category of biological weapons. The BWC negotiations and non-proliferation treaty have contributed significantly to banning the production of lethal biological material.⁴⁹ A nation's capability to counter a bioterrorist assault, hence, depends

significantly on the condition of awareness of therapeutic care systems and public health infrastructure. Therefore, strong public health infrastructure is imperative not only to protecting and enhancing public health but also to the nation's security.

International Health Regulations – 2005

The aim of the International Health Regulations (IHR) – 2005 is to prevent the spread of infectious diseases. Thus, IHR is a legal instrument which has partnerships with the World Health Organization (WHO) and its purpose is to ensure protection against the spread of diseases.⁵⁰ In 2005, the Government of Pakistan along with other 196 states, which chiefly are WHO member states, accepted and implemented the revised IHR. The IHR involves member states to build the essential capacities and necessary measures to detect, identify, alert, respond, assess, and report international public health emergencies.

These regulations help member countries to expand their capabilities to detect and report threats early with the aim of prevention and keeping the effect of infectious diseases threats to a minimum. Also, the IHR is designed to prevent, control, and counter the threats of biological events. Pakistan has the implementation of the IHR widely strengthening the essential public health capacity and advancing the building of public health emergency capacity along with preventing, controlling and countering the threats of biological events.⁵¹

Biological agents' threat represents a substantial challenge to agencies and organizations responsible for handling biodefense. Preparation in opposition to a biological agents' threat and attack is complex and requires the coordination of many branches of government that have not worked together. Early detection and performance organization of an assault, however, will be the primary responsibility of a public health system. The public health system would soon be besieged by biological agents' threats. For the public health sector to be actual in its tasks of discovery and intervention, more consideration should be rewarded for fixing the infrastructure of public health and biological agents' threat surveillance system specifically.

Development of the public health infrastructure not only defends Pakistan in the case of biological agents' threat but will also help recognize and manage natural outbreaks of infectious diseases in peacetime. Therefore, there should be a development of public awareness before, during and after such an attack. The people should be educated concerning the potential exposure of a biological weapon and numerous steps that are required to be taken to check bio-defense capabilities and certify enough protection from emerging threats. The government should provide emergency health insurance coverage during a bioterrorist attack. A nation's capability to counter a biological threat assault, hence, depends significantly on the condition of awareness of its therapeutic care systems and public health infrastructure. Pakistan needs to transform the policy to strengthen the public health system so the new policies would also strengthen Pakistan's capability to respond to any occurrence of infectious disease.

Unlike other national security protection measures, the defensive actions against biological outbreaks have suitable dual-use implications that would help Pakistan's citizens in a disaster and daily life. Developing the public health infrastructure will not only defend Pakistan in the case of deliberate outbreak of biological agents but will also assist in recognizing and managing naturally occurring infectious diseases. Pakistan has deficient financial and human assets to afford adequate health facilities to its whole population. Consequently, detection and anticipation of infectious diseases, such as Crimean-Congo Hemorrhagic Fever at an early stage is very remote, particularly, in rural areas and peripheral districts of Pakistan. Pakistan has experienced several hemorrhagic fevers outbreaks caused by Dengue and Congo virus.

In general, preparedness against biological threats is complex and needs the coordination of numerous branches of government that have not previously worked together in Pakistan. In terms of existing policy measures to prevent biological threats, Pakistan has the Drug Act (1976), Export Control Act (2004), Environmental Protection Act (1997), Anti-Terrorism Act (1997), National Biosafety Guidelines (2005), Pakistan Biosafety Rules (2005), National Counter Terrorism Authority Act (2013), International Health Regulations (2005) and National Internal Security Policy (2014). At this time, the National Command and Control Centre has constituted by Prime Minister Imran Khan for ensuring effective coordination among the federal and provincial governments. Moreover, the National Disaster Management Authority with Provincial Disaster Management Authorities is the leading operational agency working in response to COVID-19. A major component of the national regulatory framework policy is legislation, which includes biological threats connected to guidelines and rules.⁵²

Medical Management Strategy in Pakistan

Pakistan pre- and post-disaster preparedness planning has a passive impression. The comprehensive policy framework and preparedness policies of medical management can decrease vulnerabilities in Pakistan. A public information strategy should be devised that can provide clear and accurate information about when treatment is required and where it should be received. In Pakistan, the laboratory capability policy refers to the blockades that prevent biological threats whether theft or deliberate or accidental release of dangerous biological agents from laboratories. No sole tool is adequate to recognize any biological threat definitively, hence, diagnostic systems must be competent to identify numerous biological markers.

Surveillance Policy of Pakistan

The vulnerabilities to natural outbreaks of biological agent's upheavals rank top in the third world countries. The emergence of infectious diseases, especially, Dengue, Congo Virus and Coronavirus is a serious health problem in Pakistan. Consequently, there is a need for rapid identification of disease surveillance policies which constitutes timely tracking of the public health system and controls the dangerous pathogens. The surveillance system is an emerging policy instrument in epidemiology that plays a major role in preparedness and gives early warning, which is a

significant factor in minimizing biological threats. The health surveillance policies have a link with the systematic collection, interpretation, analysis, and distribution of health data which indicate biological outbreaks and provide disease transmission information about a person, time, and place immediately after diagnosis. The existing disease surveillance system and reporting system in Pakistan are not working properly and response is slow to detect the natural or deliberate outbreaks. There is a need for constant surveillance and alertness for the effective detection of biological outbreaks.

Recommendations for Future Threats

The current COVID-19 pandemic is an opportunity to revise the biodefense policy and develop new norms against biological risks. In Pakistan, there is a need to identify critical gaps in preparedness and also prioritizing defense against biological risks. As there are a large number of coronavirus cases in Pakistan, thus, it is engaging government agencies and mobilizing the private sector to work collaboratively against the COVID-19 pandemic and health threats. Yet, COVID-19 pandemic cases are prevailing in Pakistan because of the shortage of workforce, risk communication, surveillance, preparedness, and training. Pakistan needs to strengthen the capacity-building strategies against biological risks at the national and local levels, such as health workforce, a technical support unit, monitoring and early reporting of disease. Moreover, global and national cooperation needs sustainable developments for countering new challenges of an outbreak of COVID-19 pandemic and future biological risks.

Conclusion

The natural or accidental and the subsequent deliberate use of biological agents after 9/11 have clear implications for the whole world. In this regard, extensive organizational measures at the international and national levels have been taken against the natural or deliberate proliferation of biological agents. Yet, the terrorist incident of 9/11 and recent outbreaks of a novel coronavirus and Ebola virus revealed numerous weaknesses in the existing policy tools for countering the biological threats. Though biosecurity, predominantly early detection, identification of the pathogen, early diagnosis by real-time and vaccines or drugs, are necessary tools for combating biological outbreaks.

COVID-19, which occurred in late 2019, has posed a global health threat, thus, concrete steps have to be taken to counter ongoing pandemic. The WHO is also promoting and supporting national public health responses against the natural or deliberate outbreaks and also focusing on rapid investigation, surveillance, and containment. Hence, comprehensive policies are an appropriate tool or mechanism to counter biological threats. Moreover, to meet the new challenges, there is still a dire need for research in the areas of early detection of biological attacks and control of infectious diseases. Pakistan may have already embarked on the path of building laws and policies with proper implementation, which has helped in ensuring adequate safeguards against biological threats. Nevertheless, no single tool or mechanism is

sufficient; consequently, limiting the biological risks requires raising awareness among the scientific community, law enforcement agencies, policymakers, and health regulatory agencies, especially in developing countries. Currently, Pakistan needs long-term funding in the field of biosecurity for the elimination of potential current biological risks and future outbreaks.

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