



ANALYSIS OF THE PRINCIPLES OF INTERNATIONAL HUMANITARIAN LAW ON THE USE OF BIOLOGICAL WEAPONS

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Abstract

This research aims to examine whether the use of biological weapons constitutes a violation of the fundamental principles of International Humanitarian Law (IHL), specifically the principles of distinction, proportionality, unnecessary suffering, and precaution. This study employs a normative juridical method by analyzing international legal instruments such as the Biological Weapons Convention (BWC), the Geneva Conventions and their Additional Protocols, as well as historical precedents and documented uses of biological agents in armed conflicts. The analysis is conducted through systematic and historical interpretation, connecting the evolution of biological weapons with the contemporary framework of IHL. The findings indicate that biological weapons inherently contradict the core principles of IHL due to their indiscriminate nature, uncontrollable spread, prolonged suffering, and large-scale impact on civilian populations. These characteristics render biological weapons incapable of distinguishing between legitimate military targets and civilians, resulting in unavoidable and disproportionate harm. Moreover, their pathogenic properties produce excessive suffering and create significant risks beyond the battlefield, thereby violating the principles of unnecessary suffering and precaution. Consequently, the use of biological weapons in any armed conflict qualifies as a serious breach of IHL and may constitute a war crime under international legal regimes.

Keywords: *biological weapons; international humanitarian law; war crimes; IHL principles; Biological Weapons Convention.*

Abstrak

Penelitian ini bertujuan untuk mengkaji apakah penggunaan senjata biologis merupakan pelanggaran terhadap prinsip-prinsip dasar Hukum Kemanusiaan Internasional (Hukum Humaniter Internasional/IHL), khususnya prinsip perbedaan, proporsionalitas, penderitaan yang tidak perlu, dan kehati-hatian. Studi ini menggunakan metode yuridis normatif dengan menganalisis instrumen hukum internasional seperti Konvensi Senjata Biologis (BWC), Konvensi Jenewa dan Protokol Tambahannya, serta preseden historis dan penggunaan agen biologis yang terdokumentasi dalam konflik bersenjata. Analisis dilakukan melalui interpretasi sistematis dan historis, menghubungkan evolusi senjata biologis dengan kerangka kerja kontemporer IHL. Temuan menunjukkan bahwa senjata biologis secara inheren bertentangan dengan prinsip-prinsip inti IHL karena sifatnya yang tidak pandang bulu, penyebarannya yang tidak terkendali, penderitaan yang berkepanjangan, dan dampaknya yang besar terhadap penduduk sipil. Karakteristik ini membuat senjata biologis tidak mampu membedakan antara target militer yang sah dan warga sipil, sehingga mengakibatkan



kerugian yang tidak dapat dihindari dan tidak proporsional. Selain itu, sifat patogeniknya menghasilkan penderitaan yang berlebihan dan menciptakan risiko signifikan di luar medan perang, sehingga melanggar prinsip penderitaan yang tidak perlu dan kehati-hatian. Oleh karena itu, penggunaan senjata biologis dalam konflik bersenjata apa pun memenuhi syarat sebagai pelanggaran serius terhadap hukum humaniter internasional dan dapat merupakan kejahatan perang berdasarkan rezim hukum internasional.

Kata kunci: senjata biologis; hukum humaniter internasional; kejahatan perang; prinsip-prinsip hukum humaniter internasional; Konvensi Senjata Biologis.

I. INTRODUCTION

The development of modern weapons technology has led to increasingly complex warfare patterns, including the emergence of biological weapons as highly destructive military tools. Biological weapons enable the widespread dissemination of pathogenic agents, posing a threat to both civilian populations and global health infrastructure. Within the context of international law, the use of biological weapons poses significant problems due to their unpredictable and difficult-to-control nature. Their impacts not only occur during the conflict but also have the potential to persist for generations to come.

International Humanitarian Law (IHL) itself was formulated to limit the impact of armed conflict, protect civilians, and ensure that the methods and means of warfare are used civilly. Therefore, uncontrollable weapons raise serious questions regarding their legality. The principle of distinction is a key principle in IHL, requiring conflicting parties to distinguish between combatants and civilians. However, the nature of biological weapons deployment makes this principle nearly impossible to implement. Furthermore, the principle of proportionality stipulates that civilian losses must not exceed legitimate military advantage. Because the impact of biological weapons is difficult to limit, evaluating proportionality becomes highly problematic.

Biological weapons also have the potential to violate the principle of unnecessary suffering, as their pathological effects can cause prolonged pain, permanent disability, or mass death that is not immediately detected. This places biological weapons in the category of weapons that cause excessive suffering. The precautionary principle demands maximum caution before carrying out an attack, including considering long-term risks and unintended side effects. With the uncontrolled spread of pathogenic agents, this requirement is nearly impossible to meet. Although the Biological Weapons Convention (BWC) prohibits the development, production, and stockpiling of biological weapons, its implementation still

faces challenges in verification and oversight. This opens the possibility of misuse or covert development by certain countries.

A number of countries are still considered to possess potential offensive biological capabilities, either indirectly through dual-use research laboratories or directly through covert programs. This phenomenon reinforces the urgency of analyzing the legality of their use. Global challenges such as the pandemic demonstrate that the spread of biological agents, even naturally occurring, can cause systemic disruption to public health, the economy, and social stability. If the same occurs through military action, the impact could be far more destructive.

Previous research indicates that most studies on biological weapons focus on security, bioethics, or public health aspects. However, an in-depth analysis of the principles of IHL still requires more systematic discussion. Therefore, a comprehensive study of the compatibility of biological weapons with the four basic principles of IHL is urgently needed. This analysis is crucial for strengthening legal norms and providing a stronger foundation for preventing their use.

Normative legal studies are the most relevant approach to examining this issue, as they focus on the interpretation of international legal regulations, conventions, and doctrine. Thus, research can produce objective and systematic legal arguments. This study aims to answer the question: "Does the use of biological weapons constitute a violation of the basic principles of International Humanitarian Law?" This question will be addressed through an examination of the principles of distinction, proportionality, unnecessary suffering, and precaution. By combining normative analysis with an understanding of the characteristics of biological weapons, this study is expected to contribute academically to the development of modern humanitarian law literature. The results are also expected to serve as a reference for policymakers, legal practitioners, and international institutions in formulating more stringent and effective regulations.

II. RESEARCH METHODS

This research uses a normative legal approach because its primary focus is to examine the written rules and basic principles of International Humanitarian Law. This normative approach was chosen to ensure the analysis is conducted conceptually and doctrinally, and in accordance with international legal research standards. The data reviewed comprises relevant

legal materials such as conventions, international treaties, and official comments from international institutions. This research does not utilize empirical observation because the issue of biological weapons use is a legal phenomenon analyzed through norms, not through field data collection. The analysis is conducted deductively to assess the alignment of the characteristics of biological weapons with the principles of IHL. The research focuses on four main principles: distinction, proportionality, unnecessary suffering, and precaution. Each principle is analyzed by comparing positive legal provisions with established academic doctrine. The results of the review of legal instruments and literature are then interpreted to identify the relationship between biological weapons and the limitations of humanitarian law. This approach ensures that the research produces conclusions that are normative, objective, and based on legal theory. Therefore, a normative legal approach is the most appropriate framework for answering the research problem formulation.

The research data sources consist of primary, secondary, and tertiary legal materials to facilitate a comprehensive and hierarchical analysis. Primary legal materials include the Biological Weapons Convention (BWC), the Geneva Conventions, the ICRC Commentary, and related international legal instruments. Secondary legal materials include books, scientific journals, reports from international institutions, and academic analyses in the field of humanitarian law and biosecurity. Meanwhile, tertiary legal materials include legal encyclopedias, legal dictionaries, and supporting academic indexes. All sources were collected through a systematic search using international journal databases such as HeinOnline, JSTOR, Taylor & Francis, and ScienceDirect. Data collection was conducted through an in-depth literature review, screening relevant documents between 2021 and 2025 to ensure the research remains up-to-date. Each source was then analyzed for its suitability to the research focus, particularly regarding the four basic principles of IHL. The collected legal materials were classified based on theme, legal principle, and relevance to the nature of biological weapons. The results of this classification were used as the basis for developing a coherent and structured legal argument. By using multiple sources, this research ensured the objectivity and accuracy of the analyzed legal data.

The analytical technique in this study employed a juridical-qualitative analysis to interpret the legal data systematically and in-depth. The analysis was conducted by comparing international legal norms with the technical characteristics of biological weapons.

Researchers examined the compatibility between the use of biological weapons and the legal limitations established by the four principles of IHL. Each principle was analyzed separately to ensure the accuracy of the legal arguments formed. The results of the analysis per principle were then comprehensively linked to determine the level of legal violations that occurred. Deductive reasoning techniques were used to draw conclusions based on the analyzed legal theories and norms. The research flow was systematically structured, starting from problem identification, literature search, data classification, legal analysis, and drawing conclusions. The analysis process also considered doctrine and expert opinions to strengthen the validity of the arguments. Each analytical result was verified twice through cross-comparison between relevant literature. With this method, the research can produce comprehensive, measurable, and academic legal conclusions.

III. RESEARCH RESULTS

The research findings and discussion should be written in the same section. They should be presented sequentially, starting with the main findings and continuing with a discussion. Figures and tables (if any) should be placed in the same section and should be actively edited by the editor. If necessary, the Research Findings and Discussion can include subsections to further elaborate on the research findings.

The research findings indicate that biological weapons have fundamentally different characteristics than conventional weapons. These weapons operate through biological agents capable of multiplying in the human body and the environment. Their uncontrolled spread is a key finding relevant to the principles of International Humanitarian Law. The research findings also demonstrate that the effects of biological weapons are not limited by time or space. Literature data indicates that biological agents can cause widespread epidemics even after a conflict has ended. This fact demonstrates the long-term impact of biological weapons on civilian populations. The analysis also reveals that the use of biological weapons is difficult to target specifically against combatants. The inability to distinguish targets makes these weapons potentially a violation of the principle of distinction. Another finding is that the level of suffering caused by biological weapons is extremely high. Thus, biological weapons are in conflict with basic principles of humanitarian law.

The study found that almost all sources of international law expressly prohibit the use of biological weapons. The Biological Weapons Convention (BWC) is the primary

instrument affirming this prohibition. Furthermore, ICRC comments also indicate that biological weapons contradict humanitarian principles. The researchers found that there is no legal mechanism permitting the use of these weapons under any circumstances. Literature review indicates that biological weapons are categorized as indiscriminately harmful weapons. This fact supports the research findings regarding the inability of biological weapons to be used in a targeted manner. The researchers also found that the effects of biological weapons are disproportionate to any military objective. In addition to violating the principle of proportionality, biological weapons also violate the principle of unnecessary suffering. All legal data analyzed consistently supports a total ban on biological weapons. Therefore, the research findings reinforce the conclusion that these weapons lack legal legitimacy.

The research also shows a tendency for certain countries to continue developing biological capabilities covertly. These findings were obtained from academic reports and historical documents analyzed in this study. The researchers found that the motives for developing biological weapons are often linked to defense and deterrence interests. However, the research findings demonstrate that these actions still violate the BWC. Historical data shows that countries such as the United States, the Soviet Union, and Japan have conducted biological experiments. These findings strengthen the argument that biological weapons have a very high potential for misuse. The analysis also shows that developments in modern biotechnology increase the risk of developing new weapons. Technological advances can facilitate the modification of pathogens to make them more lethal. The research findings indicate that the international community still faces difficulties in verifying compliance with the BWC. Therefore, the risk of violation remains a global concern.

The research findings identify that the principle of distinction is almost certainly not met when using biological weapons. The analysis shows that biological agents do not have the ability to distinguish between combatants and non-combatants. Literature data supports the fact that the spread of pathogens always impacts civilian populations. The researchers also found that biological weapons are very difficult to control once released into the environment. This causes their impact to spread without specific territorial boundaries. Other findings indicate that even the troops releasing the weapons can be affected. This fact demonstrates that biological weapons are inconsistent with the basic principles of military

objectives. Furthermore, the analysis shows that biological agents pose an epidemic risk, making biological weapons incompatible with the structure of international humanitarian law. Therefore, the principle of distinction cannot practically be applied to biological weapons.

This study also found that the principle of proportionality cannot be applied to the use of biological weapons. The destructive impact of biological weapons far outweighs any potential military advantage. Literature data shows that biological agents can devastate public health on a large scale. Researchers found that no military objective can justify the uncontrolled spread of pathogens. Long-term impacts such as paralysis of health systems are included in the study findings. The study also showed that biological weapons can cause ongoing humanitarian crises. In such situations, the principle of proportionality becomes irrelevant. In fact, all humanitarian law doctrines reject the use of weapons with uncontrolled impacts. Therefore, biological weapons have been proven to fail to meet the principle of proportionality. This finding strengthens the legal position for their prohibition.

The study's findings regarding the principle of unnecessary suffering demonstrate that biological weapons cause extreme suffering. Historical data from biological warfare cases demonstrates prolonged effects. Researchers found that symptoms of disease caused by biological agents often involve excruciating pain. Furthermore, this suffering often continues even after the conflict has ended. This fact places biological weapons in the category of inhumane weapons. Analysis of humanitarian law doctrine supports this assessment. The study also shows that no military necessity can outweigh the severity of the suffering caused. Even targeted combatants will experience suffering beyond tolerable limits. These results confirm that biological weapons violate the principle of unnecessary suffering. Therefore, they are in absolute conflict with international humanitarian norms.

The latest findings demonstrate that the precautionary principle is impossible to fulfill in the use of biological weapons. Researchers found that no oversight mechanism can ensure biological agents remain within controllable limits. Literature data indicates that the spread of pathogens always has a high degree of uncertainty. Analysis indicates that even laboratory experiments have a certain degree of leakage. This fact confirms that their use in armed conflict would be far more dangerous. The research also identified that global risks are increasing due to modern human mobility. The spread of disease is no longer confined to specific regions. These conditions make biological weapons incompatible with the

precautionary principle in humanitarian law. Therefore, biological weapons absolutely cannot meet the precautionary requirement. These results conclude the overall analysis regarding the incompatibility of biological weapons with the four basic principles of IHL.

Biological weapons are a form of weaponry that inherently contradicts the objectives of international humanitarian law. The basic principles of humanitarian law emphasize the protection of human beings in armed conflict. In this context, biological weapons pose a far greater threat. The primary reason is the uncontrollable nature of biological agents. This makes their implementation incapable of meeting the requirements of international law. The discussion also demonstrates that these weapons cannot be used selectively. This inability to use biological weapons makes the use of biological weapons always indiscriminately harmful. This fact makes biological weapons a form of threat inconsistent with humanitarian objectives. Therefore, international law provides an absolute prohibition against them. This discussion strengthens understanding of the global legal position on the use of biological weapons.

Biological weapons violate not just one principle, but all the main principles of humanitarian law. The four principles of distinction, proportionality, unnecessary suffering, and precaution are standards that must be met in war. In the case of biological weapons, none of the principles can be applied in their entirety. The uncontrolled spread of biological agents immediately defeats the principle of distinction. The widespread destructive impact makes proportionality irrelevant. Meanwhile, the extreme suffering that biological weapons cause violates the principle of unnecessary suffering. The risk of uncontrolled spread also violates precautions. Therefore, the discussion demonstrates that these weapons are in total violation of humanitarian law. The discussion also links research findings to the applicable international legal framework. The BWC is considered the primary instrument for the prohibition of biological weapons. However, the discussion demonstrates that the BWC lacks a robust verification mechanism. This has led many countries to continue conducting biological research with military potential. The discussion also shows that current regulations are unable to close the gaps for technological misuse. In this context, international law enforcement needs to be strengthened. Research shows that this need is increasingly pressing due to the development of modern biotechnology. The risk of the emergence of engineered pathogens is a major issue in international legal discourse. Therefore, the discussion

emphasizes the need for reform of the BWC. This reform should include mandatory verification mechanisms and strong international sanctions.

Biological weapons are not only a legal issue but also a moral one. Humanitarian values are the foundation of all humanitarian law. Biological weapons violate these values because they cause unjustifiable suffering. The discussion demonstrates that moral aspects play a significant role in the global ban on these weapons. Furthermore, biological weapons have a broad psychological impact. Societies can experience collective trauma due to the threat of deadly diseases. The discussion also demonstrated that the use of biological weapons undermines human security in the long term. This places biological weapons in the category of inhumane weapons. Therefore, the discussion emphasized the absolute prohibition. This prohibition is a manifestation of humanitarian values under international law.

The analysis of Unit 731 demonstrates how biological experiments produced extreme suffering. The discussion demonstrates that even in the context of war, such acts were considered a serious crime. Cases of biological warfare in various ancient conflicts provide similar evidence. This strengthens the argument that biological weapons have a long history as instruments of mass torture. The discussion also shows that modern states have attempted to close this dark chapter. However, the discussion emphasizes that this threat remains real today. Global risks increase with technological advancements. Historical cases serve as a warning to the international community about the dangers of biological weapons. Therefore, this prohibition must be maintained and strengthened. The discussion also highlights global security aspects related to biological weapons. The spread of dangerous pathogens can create geopolitical instability. Conflicts can escalate due to the uncertainty of the impact of biological weapons. This discussion demonstrates that biological threats are not only a legal issue but also a strategic one. Countries can experience mutual distrust due to suspicions of biological weapons development, worsening international relations. The discussion emphasizes that the potential for conflict escalation is very high. Furthermore, the spread of pathogens can create global economic chaos. The impact can reach all countries without political boundaries. Therefore, the discussion concludes that biological weapons constitute a threat to international stability.

The public health aspect demonstrates that biological weapons impact all living systems. The spread of biological agents can destroy national health structures. The resulting diseases can cause mass mortality. The discussion demonstrates that countries are not fully prepared to deal with the spread of modified pathogens. This exacerbates the humanitarian impact of biological weapons. The discussion also emphasizes that the global health system remains vulnerable. Deadly diseases spread in conflict can spread across countries, with their impacts lasting for years. Therefore, the use of biological weapons not only violates humanitarian law but also endangers global health. This discussion demonstrates the multidimensional nature of the threat.

Humanitarian law must be able to address the increasingly complex challenges of modern technology. The discussion demonstrates that current legal instruments are not fully adequate. Biological weapons developed through genetic engineering technology pose a new challenge. The risks of synthetic pathogens were unimaginable when the BWC was first drafted. The discussion demonstrates that the international community needs new, more comprehensive regulations. The new legal framework must be able to address the risks of synthetic technology and bioengineering. Furthermore, law enforcement mechanisms must be strengthened. This discussion emphasizes that humanitarian law must continue to evolve to safeguard humanity. Therefore, updating international regulations is an urgent need.

IV. CONCLUSION

This study concludes that the use of biological weapons constitutes a serious violation of the fundamental principles of International Humanitarian Law: distinction, proportionality, unnecessary suffering, and precaution due to their uncontrollable nature, indiscriminate targeting, widespread destruction, and inhumane suffering. Although the Biological Weapons Convention (BWC) provides a strong legal basis for prohibiting these weapons, the weakness of verification mechanisms and the rapid development of biotechnology create a risk gap that requires strengthening international regulations and oversight systems. Biological weapons also have multidimensional impacts that threaten political stability, global security, and human safety, making their absolute prohibition a step in line with universal humanitarian values. Therefore, this study emphasizes the need for enhanced biosecurity, global cooperation, and an updated international legal framework to effectively respond to modern biological threats and maintain moral integrity and humanitarian objectives in armed conflict.

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