TERRORIST CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) THREAT TO EUROPE

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Abstract: This report studies the threat for the European security posed by terrorist attacks with chemical, biological, nuclear or radiological (CBRN) materials. Latest tendencies of the problem of the last few years are being studied, and some cases broadly discussed in the media worldwide are being analyzed. Terrorists’ methodologies are being assessed, and their possibilities to obtain weapons of mass destruction. The possibility for developing an improvised explosive device with chemical substances aiming to cause damage to critical infrastructure targets which would pose a threat to the national security of the country is also considered.

Keywords: TERRORISM, CRITICAL INFRASTRUCTURE, WMD, IMPROVISED EXPLOSIVE DEVICE, CBRN MATERIALS

Introduction

In the recent years, some terrorist groups, as well as individuals, have shown interest in/or attempted to use chemical, biological, radioactive, or nuclear (CBRN) materials in the planning and/or conducting of terrorist attacks. According to the University of Maryland’s Global Terrorism Database GTD [1] database, worldwide there have been 534 terrorism related incidents involving the use of chemical material, resulting in an unknown number of fatalities, 33 incidents of biological terrorism, resulting in 9 fatalities, 14 incidents (attempts) of non-fatal radiological terrorism incidents, and 0 (zero) incidents of nuclear terrorism.

It should be noted that terrorist groups maintain constant interest and intention to use CBRN materials in their attacks, especially taking into account the increasingly accessible dual-use chemicals, plant toxins and poisons. This report studies the development of the interest of the Sunni terrorist jihadist group in CBRN terrorism, which is operating mainly in the Middle East - Islamic State of Iraq and the Levant (ISIL), also known as Islamic State of Iraq and Syria (ISIS). The terrorist organization is not the only one interested in developing such opportunities, but the examples that shall be considered here are result of its activities in past years.

Back in time using a device containing CBRN material, as well as the overall methodology for the production and use of such materials in a terrorist attack, was a perception of a sophisticated process, often regarded as impossible to be performed by most of the terrorist groups. Data from the last few years, including the present 2019, indicates something different. Namely, individuals without any special training or specific expertise have been able to produce or acquire CBRN materials in Europe, without much difficulty.

The use of CBRN materials by terrorists or malicious individuals has already left the borders of the territories with military actions, which should be taken into account and today the global society should be aware of the possibility to face CBRN terrorism [2], a threat that may occur in peaceful territories, including Europe.

It should be also considered that a large number of casualties is not always the primary aim of a terrorist act. The very fact that a CBRN material was used is capable of bringing a tremendous destructive effect. Conducting an attack with CBRN materials - whether successfully completed or not - will be used as an example to inspire individuals willing to carry out such terrorist attacks.

In short to medium term, it may be assumed that, as mentioned above, dual-use chemicals, plant toxins and poisons are likely to pose a major threat in a CBRN terrorist plot. This assumption, together with the increasing availability of expertise, equipment and materials, is a growing concern for the security of the international community, including the European one.

A change in the methodologies used by terrorist groups

There is a new trend in the methodologies used by terrorist groups aiming to simplify the used methods. Such are, for example, melee weapon attacks. A knife or vehicle attacks [3, 4], which occurred in Europe as well, require equipment that is easy to acquire and does not need any prior preparation or training. Evidences indicate that interests are directed to accessibly available for acquisition and/or production CBRN materials that do not require a specific knowledge or training.

The interests of ISIL [5] in acquiring CBRN capabilities

The first evidence that ISIS used CBRN material in their attack was from the beginning of 2014, when it was revealed that they had activated an improvised explosive device (IED) using chlorine. With that the group demonstrated a significant change in its ability to use IEDs with chemical substances [6].

ISIL continued to work in that direction by developing sulfur mustard (warfare agent). It is assessed that they have succeeded in that effort by taking advantage of the university’s laboratories located in Mosul, the city they took control of in 2014. To complete that, they had the support of both scientists, technicians and engineers, and followers who joined the “Caliphate”, whether from the region or from other parts of the world [7].

ISIL were able to launch attacks across a large geographic region, and taking into account the progress of their capabilities, the demonstration of a successfully developed chemical weapons program should be considered, even though it was assessed by international experts, as basic or at an early stage of development.

In addition to the above, in time and having in mind the facilities of the University of Mosul, ISIL succeeded to further develop its CBRN capabilities and obtain thallium sulfate and nicotine toxin [8]. These two types of substances (nicotine, thallium and their derivatives) are highly toxic. In fact, they are extremely toxic and can even cause death in small amounts. The difference is that thallium causes death slowly and painfully. While nicotine is an alkaloid and acts quickly. Both substances are deadly. The easiest way to get intoxicated with these substances is through contamination of food, drink and drinking water. Experts estimate that the use of the substances in a terrorist attack does not require high level of scientific knowledge [9]. It is considered quite possible that ISIL may have provided information from the tests they had completed to their followers not only in the Middle East but elsewhere in the world.

Crossing borders

In 2016/2017 ISIS came under increasing military pressure, and the terrorist group tried to direct and transfer its influence beyond the territories of the battlefield. Intelligence agencies alarmed [10]
that they have detected information about individuals developing instructions and manuals for the use of CBRN materials in terrorist acts. Given the potential of social media, it is likely that some of these documents are already circulating to ISIS followers outside the territory of the “Caliphate”. In addition, the online community of ISIS followers also actively supports the use of CBRN materials, in particular chemical and biological substances, which goes beyond the borders cited above and the concept of international CBRN threat, which includes the territory Europe [11], is gaining realistic dimensions.

In the period 2017-2018 that was proven, since about several cases around the world, information shared by ISIS to their online followers was able to inspire, push forward and assist in the development of malicious scenarios involving the use of CBRN materials.

The examples discussed below were in preparation for a terrorist attack, both in Europe and in other parts of the world, and fortunately the law enforcement agencies succeed in stopping the implementation of these plots at the stage of obtaining information about possible means of implementation or in the process of production of the CBRN material.

Examples of attacks with CBRN materials

Historical examples of the use of ricin

A well-known case with the use of ricin was the 1978 case when it was used to assassinate the Bulgarian dissident and journalist Georgi Markov, where it is believed that the Bulgarian special services injected ricin into the victim’s leg, using the so-called “Bulgarian umbrella”. He passed away a few days later.

Back in time, members of terrorist groups were also interested in completing attacks using ricin. In January 2003 a counter-terrorism operation was under way in the UK against a terrorist cell suspected of being linked to al-Qaeda and intending to launch attacks the UK with ricin and other poisons.

In August 2011 The New York Times [12] reported that US counter-terrorism officials have expressed growing concern that al-Qaeda in the Arabian Peninsula was trying to produce the deadly poison ricin to pack it with small explosives and use it in attacks in the US.

The Cologne case

The first case of ricin for the territory of modern Europe, which has been widely reported in the media, was from June 2018. It was about a Tunisian national and his wife who were preparing to complete a terrorist attack by planning to use ricin in an improvised explosive device. The two were arrested and the plot was thwarted. It was revealed that the Tunisian national was connected with the ISIS, and he made two attempts to join the terrorist group as well. The German services assessed that the Tunisian national had both ricin and the materials to make an improvised explosive device as well.

Ricin is a highly toxic plant poison. It is obtained from the seeds of the plant Ricinus communis, which normally yields castor oil, while castor remains in plant fibers. It is a glycoprotein that disrupts protein synthesis in the cell, causing cell death. Castor is LD50 in the range of 1 to 20 milligrams per kilogram if taken orally, but much less is required to cause death if inhaled or injected. (The meaning of the term LD 50 is actually the lethal dose at which 50% of individuals who take a substance die. This is the most commonly used measure of toxicity and is usually expressed in terms of kilogram body weight. The lower the corresponding is the value, the less amount of the substance is needed to kill, the more poisonous the substance is.) According to the Federal Office for the Protection of the Constitution - Germany, ISIL conducted experiments with ricin in 2016 in Iraq. One of the manuals of the terrorist organization describes how exactly the poison is to be prepared and used, which means that a Tunisian national may have been instructed by IDIL to prepare and carry out the attack. The European security services estimate that the Cologne case is the first one where a jihadist produced a toxic biological substance in Europe. With that, the threat of a terrorist attack using CBRN material in Europe receives real dimensions and poses new challenges to the law enforcement agencies [13] of the Old Continent.

According to some assessments, the possible use of CBRN materials in a terrorist attack is unlikely to result in a large number of fatalities. However, its implementation is capable of causing chaos and panic among the population. Terrorist groups are aware that the number of casualties is less important than the symbolism sought by them, that would help them propagate their ideas and strike terror, which would be the result of a CBRN attack, no matter how successful it was. The instructions and manuals circulated by terrorist groups for the preparation of an IED, the use of chemicals, and the extraction of plant toxins which to be used in a terrorist attack are easily accessible for implementation even by individuals without technical or scientific knowledge for their application. It doesn't take much effort to get the right materials.

The Cologne case shows that the threat of CBRN terrorism has grown significantly in the last few years. The share of information is significantly last, unimpeded and in an accessible language, which is facilitated by the Internet and social media. YouTube videos can be found on channels that explain step by step the production of a poison/hazardous material, whether biological or chemical substances available on the market.

Online propaganda of the terrorist groups

Another example studied in this report is the 2017 Bahrun Naim case. He was a member of ISIS, who transferred his activities from Indonesia to the “Caliphate”. Naim wrote down and uploaded online terrorist manuals and instructions, including: Nuclear for Dummy, How to Make Explosives in Your Kitchen, and others. When communicating with his followers on his website, he used Internet bots which allowed access to an interactive communication platform. He has appeared on the Internet as a mentor and trainer for followers. Much of the information on nuclear materials in the manual was inaccurate [14], such as the use of a microwave oven to convert thorium into uranium for nuclear weapons. However, the instruction also included information on how to extract thorium from lamp mantels.

Through his online contacts, Bahrun Naim succeeded to inspire an Indonesian terrorist, part of a terrorist cell. The cell was detected and arrested of five people in possession of Naim's manuals followed. The individuals were trying to extract radioactive material (thorium) to carry out an attack with a dirty bomb.

A key element of this case is the fact that the Indonesian terrorist had never met Bahrun Naim in person, but was inspired by him through their online contacts. It should also be noted that thorium is a radioactive material of low activity and is not capable of causing immediate death. However, the fact that the terrorist cell intended to use the radioactive substance in a radioactive dispersal device is of concern. The consequences of a possible success of such an attack would reflect worldwide.

Subsequently, Bahrun Naim was killed by US counterterrorism forces air strike. However, the materials distributed by him on the Internet still exist online. It would not be wrong to say that their spread is likely to continue.

With regards to the nuclear material and the likelihood of terrorists having access to such material in order to create a nuclear device, the information is limited and sporadic at this stage. It is
reported that terrorists have had access to a yellow cake, but to obtain a nuclear weapon from that material, they would need the support of a state program so they could process it with the proper equipment. Therefore, it is assessed that the construction and use of a nuclear device by terrorists at this stage is minimal. However, it should be noted that the use of yellow cake in an improvised explosive device is considered as a dirty bomb.

**CBRN materials – accessible and easy to use**

Back in time, it was believed that the use of CBRN materials in a terrorist act would be difficult to accomplish, and is therefore not a preferred method by terrorists. In reality, however, the cases of the recent years have come to show the opposite. The CBRN threat varies in a wide range – starting from sophisticated to extremely simple, easy-to-implement and affordable methods. It has been proven that some materials, whether biological or chemical, can easily be produced at home, which would easily find application in a terrorist act. There are enough examples of that fact. Such are plant toxins. Terrorist groups have shown interest not only in ricin but also in nicotine, which are both usually easy to acquire or produce. The possibilities are not limited to that. Hundreds of chemicals from the household, industry or agriculture can be used in the production of toxic gas. The use of generally accessible chemicals for terrorist attacks is not considered as mission impossible.

The weapon systems for distribution of chemical substances are also becoming more widely accessible. A number of companies around the world manufacture ammunition and remotely controlled systems, including UAVs, designed to deliver significant quantities of non-lethal riot control agents for using by law enforcement officials. There are legitimate concerns that terrorists can relatively easily obtain such systems in order to use them to disperse dangerous chemical or biological agents. [15, 16]

The following conclusions can be drawn in that connection:

- CBRN methodologies considered above would certainly be within the capabilities of even the so-called lone wolves, individuals without serious logistical support.
- Such individuals who are not affiliated with a terrorist group which is attempting to supply or produce any of the materials cited above, are unlikely to be detected before a stage in which the plot is already advanced and evolving.
- **Large part of the materials that could be used in a CBRN attack scenarios are being legally distributed, widely used and can hardly be controlled by the competent public authorities.**
- Based on the above, it can be assessed that a possible CBRN attack would be directed at the public as a whole, as well as at specific targets, as those from the critical infrastructure [17]. Indoors and / or places frequented by a large number of people would be of interest. The possibility of using unmanned aerial systems/vehicles [18] (UASs or UAVs) and CBRN materials in Europe, including critical infrastructure sites, should not be excluded. The fact that no data on such intentions are available so far should not be underestimated as a potential threat in the future.
- CBRN methodologies which are most likely to be used by terrorists across Europe, are those requiring little or no specific knowledge and experience, as well as materials that are easy to acquire and difficult to control or prohibit.
- In recent years, we have witnessed several CBRN cases/incidents that would have the effect on increasing the level of threat posed by the use of such substances, such as the use of chemical weapons in Syria, the Salisbury “Novichok case” that became popular worldwide and others. All of them have the potential to inspire malicious individuals to commit terrorist attacks with CBRN materials.

These conclusions could be taken into consideration in the development of intelligent systems for critical infrastructure protection, such as the European Union funded Quasar project within the framework of the Smart Growth Operational Program.

**Conclusion**

The CBRN threat in the future can hardly be accurately predicted. A number of relevant factors should be considered, such as the political environment, social and religious influences, military activities, technological development, and more. However, it should be noted that the most likely lines of action would be:

- Increasing propaganda through the use of electronic and social media and disseminating information worldwide, including on CBRN materials and their use in terrorist acts;
- Use of accessible materials, whether chemical or biological;
- Increasing interest in the use of UAVs [19], which, with the advanced development of technology, makes CBRN dispersal systems an easy and accessible opportunity;
- If a successful attack is carried out, an increase in the followers and/or perpetrators of the attack should be expected.

**References**


