Journal of Bioterrorism & Biodefense

Aquino, J Bioterror Biodef 2016, 7:2
DOI: 10.4172/2157-2526.1000146

Review article Open Access

Radicalized Health Care Workers and the Risk of Ebola as a Bioterror Weapon

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Received date: April 01, 2016; **Accepted date:** May 03, 2016; **Published date:** May 09, 2016

Abstract

A biological attack employing the deliberate spread of Ebola virus by radicalized health care workers is a significant public health and national security threat. The chain of custody for medical materials contaminated with Ebola can be vast, and opportunities for health care workers to self-infect themselves with Ebola exist. As demonstrated in recent years, Westerners will support Islamic terror organizations by carrying out attacks on domestic soil. This paper addresses scenarios by which Ebola virus could be disseminated into unsuspecting populations by health care workers. Also elucidated are risk mitigation methods.

Keywords: Ebola; Terrorism; Bioterror; Radical; Healthcare; Suicide; Attack; Outbreak; Surveillance; Virus; Travel; Laboratory; Clinical; Hospital; Communicable disease

Introduction

Although most terror cases involve the use of firearms and explosives, methods to inflict larger scales of damage and panic have been employed: sarin, anthrax, hijackings of aircraft. A biological attack scenario which has not received ample attention is the deliberate spread of Ebola virus, though the situation has been previously described in literature [1,2]. When bearing in mind the prevalence of Ebola during the outbreak that began in 2014, workers have had ample opportunities to self-inoculate themselves and become delivery mechanisms of Ebola, if they had desired to do so. Since 2014, more than 28,000 Ebola cases in West Africa have been suspected, classified as probable, or confirmed and total deaths exceed 11,000. In Guinea, health care workers are 42 times more likely to become infected than non-healthcare workers [3]. Humanitarian efforts have involved personnel from diverse countries and in the course of their duties; health care workers from Liberia, Sierra Leone, Guinea, Nigeria, Spain and the United States have contracted the disease. Even in the continental United States, health care workers can become infected, as seen when Nurse Nina Pham became ill while caring for an Ebola patient in Texas. This paper addresses scenarios by which Ebola virus could be purposely disseminated into unsuspecting populations by health care workers.

Ebola Virus

Ebola virus disease is zoonotic, meaning that it involves both animals and humans. Bats are the reservoir host and can transmit the virus to other animals such as apes, monkeys, antelopes and humans. Transmission can also occur during a spill over event, in which an animal or human contracts disease via contact with a bat (i.e. through hunting or meat preparation). Human-to-human transmission is achieved by way of blood or bodily fluids of sick persons, or with the bodies of those who died from the disease. Human-to-human transmission is often completed during traditional African funeral practices, in healthcare settings and amongst families who have unprotected contact with sick members [2].

Symptoms of Ebola

Symptoms of Ebola include fever, headache, muscle pain, weakness, fatigue, diarrhoea, vomiting, abdominal pain, bleeding and bruising. Symptoms may begin between 2 to 21 days following exposure, with the average being 8 to 10 days. There is currently no vaccination, although trials are underway. Treatment involves supportive clinical care. Those who survive the disease develop antibodies that last at least 10 years [4].

Ebola Virus Category

Ebola virus is categorized as a category A priority pathogen by the National Institute of Allergy and Infectious Disease. Category A pathogens are those that pose the highest risk to national security and public health because: 1) they can be easily disseminated or transmitted from person to person, 2) they result in high mortality rates and have the potential for major public health impact, 3) might cause public panic and social disruption, 4) require special action for public health preparedness [5]. Ebola has been reasoned to be an improbable mechanism for bioterror [6]. Historically however, there have been projects to develop its use as a biological weapon. During the Cold War, the Soviets endeavoured to cultivate Ebola virus. It is not known what type of delivery mechanism was planned, but the project was eventually cancelled [6]. The Japanese cult, Aum Shinrikyo, who infamously released Sarin in a Tokyo subway, sent members to aid the Democratic Republic of the Congo during a 1992 Ebola outbreak. The true motive however, was to collect Ebola virus for later use, an effort that ultimately failed [7].

Control and Prevention

Since controls to prevent infected persons from leaving Ebola stricken areas in Africa exist, including mandatory quarantine and observation periods, the focus of this paper will be on the potential for

Ebola to be deliberately disseminated by a healthcare worker in the United States. Specifically, healthcare personnel who may be radicalized. Guidance to prevent Ebola infection in healthcare workers is robust, and training is performed widely. Yet, if a healthcare worker, whether a nurse, physician, laboratory technician or maintenance person were motivated to become infected with Ebola and had the opportunity to come in close contact with an infected patient, contaminated equipment or bodily specimens, there is not much that could stop or even detect them. Even when employing a buddy system, in which healthcare workers are observed by others, one could conceal a self-inflicted needle stick with a contaminated hypodermic needle. The possibility of this was verified in 2009 when a virologist infected herself with a needle prick that penetrated three layers of gloves while leaving no evidence of bleeding [8]. Moreover, five experienced Ebola researchers perished from Ebola in 2014 after being exposed in their research facility [9]. The chain of custody for contaminated material is so vast, that maintaining sufficient security of pathogen is often contingent on individual healthcare workers following protocol. Unlike a transfer of physical objects such as paper currency, material contaminated with Ebola virus is impossible to quantify and track without full compliance of frontline healthcare workers.

Once a healthcare worker is infected with Ebola, he would more than likely have at least a few days before becoming symptomatic. With no mandatory quarantine policy in place for healthcare workers without suspected Ebola exposure, the newly infected employee could then set out on a mission to disseminate the virus. To further conceal his activity and not raise suspicion, the perpetrator could claim that a family emergency occurred which required immediate departure. He could then position himself in the downtown of a mega-city and wait to become symptomatic. Knowing that his time to be effectively mobile is limited, a focus on mass transit stations would be executed. Moving from one vehicle to another, making contact with people, but carefully without raising suspicion, Ebola virus could be spread to at least a few unsuspecting individuals. Once feeling too poorly to continue moving about, he could either choose to die and be found in a public venue or die in concealment. By having his body found, he could infect first responders, medical examiners and others. To further the infectivity of his death, he could kill himself by way of suicide bomb or gunshot wound to the head. If done in a crowded bus or train, those exposed to bodily fluid splatter would likely be infected, including the many rescue and clean up personnel who would arrive at the scene. Raising suspicion of Ebola infection would be lessened if the remaining body were so mangled that comprehensive autopsy is impossible. Delaying identification of the body would also hamper Ebola detection because the place of employment of the deceased would not be realized. If the attacker chose to die in concealment, his likelihood of infecting others would likely be less, but an outbreak could be more insidious.

The previous scenario described a lone wolf attack. If a coordinated team of radicalized individuals were to utilize Ebola, then the outcome could be more devastating. Not only could they launch parallel attacks in multiple cities and/or countries, they could propagate a serial attack by concealing the body of their predecessor before they themselves became infected. When taking into account the latency of Ebola virus, this method could be overwhelming because outbreaks and spread could occur so quickly that by the time Ebola was even considered, a public health emergency would be underway. As revealed in Guinea, Ebola victims most commonly presented to hospitals with dehydration secondary to vomiting and diarrhoea. Even with fluid repletion treatment, antimicrobial therapy and limited laboratory services, mortality was 43% [10]. Ebola outbreak would clearly strain public health and emergency resources. Hospitals would be bottlenecked with true and suspected Ebola cases. Societal hysteria would be rampant. First responders would not only be burdened with preventing disorder, but they themselves would be at high risk of becoming infected. These occurrences could happen before any outbreak investigations even conclude that Ebola was the causative agent.

A critical point to consider is what could occur if newly infected individuals, whether they be unsuspecting individuals or purposeful attackers, were to travel by way of commercial aircraft. During the Ebola outbreak of 2014, commercial travel out of Guinea, Liberia and Sierra Leone was heavily scrutinized. With the world being so massively interconnected by international travel, decision makers had to weigh the consequences of restricting travellers while also maintaining sufficient Ebola containment [11]. If a person symptomatic with Ebola were to travel through a major hub such as Hartsfield–Jackson Atlanta International Airport, the cascade effect would be disastrous. The ensuing outbreak investigation and contact identification process would be a massive undertaking which would require international support for locating individuals, determining need for and enforcing quarantine. It is reasonable to assert that at an airport with almost 1,000 flights per day, unwary Ebola contacts could slip through a screening process and deliver virus to their locales. A development of widespread, local outbreaks could endure as the propagation of Ebola became vast. Furthermore, containment efforts would fall behind due to resource strain. If an unprecedented decision were made by world leaders to discontinue air travel, the world's economy would come to a standstill and financial markets would collapse, at least in the short term.

Terrorism and Islamic Radicalization

Terrorism and Islamic radicalization are grave realities in today's world. The Islamic State of Iraq and Syria (ISIS) broadcasts beheadings, enslaves women and carried out the 2015 Paris and 2016 Brussels attacks. Al-Qaeda carried out the 1998 embassy bombings, 9-11 attacks and 2002 Bali bombings. Boko Haram in Nigeria kidnaps school girls. Al-Shabaab in Somalia killed dozens in a shopping mall [9-11]. The Taliban massacred 132 children in a school. The influence of these malicious groups is becoming palpable as more than 25,000 foreign fighters from over 100 countries, including 4,500 Westerners, have travelled to fight for Islamist terror groups. From the United States, more than 250 individuals have joined or attempted to fight with extremists [12]. These fighters are especially dangerous to the United States and its allies due to their ability to return to their native homes. Of the hundreds of Americans who have flown to the conflict zones in Iraq and Syria, dozens have successfully returned to the United States. Moreover, citizens from many other Western nations can without difficulty travel to the United States without applying for a visa. It is estimated that between 20 and 30% of Europeans who fought alongside extremists in Iraq and Syria have already departed the area [12].

Equipped with combat familiarity and extremist connections, foreign fighters who return to their homes are well suited to plan and carry out terror attacks on domestic soil. Even if they did not proceed with such intents, their experience makes them valuable recruiters for new generations of terrorists. The significance of their ability to be extremist propagandists is also essential to consider as their voices and influence are amplified online. The internet has been described as being a principal concern for law enforcement and others who work to detect and counter recruitment efforts of jihadist groups who target Americans [13].

An example of domestic terror associated with radical Islam is the 2009 shooting at Fort Hood. Nidal Malik Hasan was an Army officer and psychiatrist. He was born and raised in Virginia. In the months leading to his killing of 13 at a Soldier Readiness Processing Centre, Hasan had been communicating with Anwar al-Awlaki, a Yemeni and American imam who was a senior al-Qaeda recruiter [14]. Prior to being killed by a United States drone strike, al-Awlaki's influence was prevalent throughout the internet: blogs, Facebook, YouTube. The Saudis once referred to Al-Awlaki as the "bin Laden of the internet" [15]. Although it was determined by the Army that email exchanges between Hasan and al-Awlaki were consistent with research, some intelligence experts believe that the correspondence should have raised red flags [16].

In 2009, Abdulhakim Mujahid Muhammad, previously known as Carlos Leon Bledsoe, gunned down a soldier in front of a military recruiting office. Muhammad was born and raised in Memphis, Tennessee. Previously Baptist, he converted to Islam in 2004. In 2007, he travelled to Yemen and worked as an English teacher. During his arrest at a Yemeni roadside checkpoint in 2008 (he had overstayed his visa and did not have proper documentation), he was found to possess a counterfeit Somali passport, books about explosives and writings by al-Awlaki [17]. After Muhammad was arrested, it was determined that he had planned to kill far more people, but without success. Similar attacks carried out by radicalized individuals have become more frequent. If an Army officer from Virginia and a Christian raised, young man from Tennessee could become radicalized and commit murder in the name of Islam, then a person from any demographic could conceivably become domestic terrorists as well. With so many individuals working in security and public safety sensitive positions, there are a plethora of alarming situations that a radicalized person could unleash.

Conclusions

It is clear that although Ebola has yet to demonstrate real world effectiveness as a biological weapon, its potential to devastate is immense. Risk mitigation efforts should focus on securing Ebola virus in both clinical and laboratory settings, similar to what is done in some high security laboratories, such as biosafety level four (BSL-4) facilities where the world's most dangerous pathogens are studied [18]. At a minimum, individuals who frequently come in contact with Ebola virus (i.e., researchers) should receive security clearances that include a background investigation. Intelligence officials must consider increasing surveillance on any healthcare worker who exhibits potential for security compromise, whether it be financial, psychological or ideological. This level of advanced checks could involve sting operations with intelligence operatives disguised as radicalized citizens to not only identify people who are willing to collaborate with terrorists, but to analyse compliance with reporting procedures as well. During an outbreak situation, clinical healthcare workers involved with Ebola patient care should receive a rapid screening to identify persons with higher risk of being compromised and/or radicalized. This way, if any suspicious activity such as sudden absence from work were to happen, red flags could be raised and a bioterror plot may well be diverted. Another approach to preventing attack is by combating radical ideology, a root cause problem that is wreaking havoc in today's society.

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