Polio Vaccine

Public Health 1 – Summer Session II

Ankit Jain
ID: 96065117
Sophomore
Zuzana Bic, Dr. P.H., MU Dr.

Public Health Problem

Poliomyelitis or Infantile Paralysis, commonly referred to as polio, is an infectious disease caused by a virus called *poliovirus*. [5]

Why does this problem exist in society?

The virus spreads when the excretions, or secretions through the throat or nose of an infected individual, contaminates the food, water, and/or hands of an uninfected individual. The virus lives in the throat or the intestinal tract of the infected. [5]

How did this happen?

A person develops the disease within three to 21 days of contact with the virus. The infected individual is most infectious during the first seven to ten days of contraction. An individual is considered infectious, as long as they excrete the virus in their feces. Normally, the virus lodges in the throat for a period of one to two weeks. However, it is most dangerous when it spreads to the nervous system of a patient. [5]

Where did this happen?

The first case of Polio was reported in England, but historical figures and hieroglyphs show that it has existed since ancient times. [9]

What are the risks for the community in the future?

Many individuals who are infected with polio, may not even know they are infected. For mild cases, noticeable symptoms include fever, quick fatigue, muscle stiffness, headaches, nausea, vomiting etc. If the virus manages to spread to the nervous system, it can lead to severe illnesses like meningitis and paralysis. If not treated properly or left unnoticed, polio can result in permanent disability, paralysis, swallowing and breathing problems, and at times even death. Paralysis, which can lead to death, usually occurs in the muscles used for breathing. [1][5]

What are/were the etiological factors?

Polio is a highly infectious disease, which can easily be spread by means of food and water. It is even more difficult to understand, as the infected is not able to diagnose that they have the disease: this makes it more difficult to understand who is infected and who is not. The most common way this can spread can be through food, water, and physical contact. It is mostly seen in areas with poor sanitation facilities, as the virus is easily spread from feces into the water supply. [5]

How to solve the problem?

Today the world is 80% Polio free and poliovirus transmission is only widespread in developing countries, namely Pakistan, Afghanistan, and Nigeria. The eradication of polio for most of the world population has happened, due to the introduction of the Polio Vaccine in 1955. The introduction of the vaccine personified the quote ‘Prevention is better than cure’. A typical polio vaccine introduces antibodies into the blood against all types of polioviruses. Antibodies, which prevent the virus from spreading to the nervous system, helps protect an individual from polio paralysis. The vaccine is often given during childhood, in order to strengthen the immune system of the child. Fortunately, the vaccine is completely safe and has proven effective. [1][9]

There are two types of Polio Vaccines:

- Oral Polio Vaccine(OPV). It is given via drops inside the mouth.
- Inactivated Polio Vaccine(IPV). It was the first polio vaccine, developed in 1955 by Dr. Jonas Salk. It is given through an injection into the leg or the arm of the child, in four doses. It requires four doses because it induces only a small level of immunity each time. [3][5]

IPV was the only form of polio vaccine until 2000, when OPV was introduced. OPV is often preferred, as it induces a greater level of immunity and is more affordable. Additionally, it does not require that health professionals give it to individuals. Even if one is vaccinated during their childhood, there are certain adults who may still be under the radar for infection, such as adults who work in labs and handle specimens which may contain poliovirus, or travelers who visit hidden and unknown parts of the world. It is suggested that these individuals are vaccinated again. For the world to be completely polio free, it is essential for the government of each nation, specifically endemic nations, to realize the importance and need for providing clean drinking water, nutritious and uncontaminated food, and proper sanitation facilities. The best examples of where efforts to reduce polio has proven effective, is in India and China. [5]

In India, the Pulse Polio campaign served as a harbinger to the age of complete polio eradication. The project fought against the issue of polio by means of a large-scale pulse vaccination campaign, while also keeping a regular check on the already existing cases. As of 27th March 2014, WHO declared India as a polio free nation. The program was spread throughout the entire nation and there were several advertisements and branding by famous stars like Amitabh Bachchan, to encourage people to participate in the campaign, specifically the ones in the rural areas and slums. The government has since then taken several steps to improve the sanitation situation of the nation by building more toilets and providing more access to clean water. This is to basically the overall cleanliness of the nation by campaigns, such as the Swachh Bharat Abhiyan (Clean India Mission), has improved. All these efforts are to maintain the polio free status of India. [6]

China was declared polio free in 2000, however suitable steps were not taken to maintain that status; in 2011, there was an outbreak of a wild form of poliovirus from Pakistan. Since then, there were more steps taken to eradicate polio and maintain the polio free status. Their strategies mainly included high routine immunization, with regular doses of OPV, surveillance for wild poliovirus through reporting and laboratory testing, and targeted campaigns for polio affected areas. [7]

Even though there have been steps taken worldwide to eradicate polio, until polio is eradicated globally, the poliovirus still serves as a threat. The Global Polio Eradication Initiative (GPEI), which is a public-private partnership led by national governments with five partners – WHO, Rotary International, CDC, UNICEF, and the Bill & Melinda Gates Foundation aims at doing exactly that. Its main objectives include, being aware of and monitoring the already existing cases while having regular immunization campaigns and checkup programs, specifically in developing nations. [2]

Public Health in the Future

As human beings develop, microorganisms also seem to develop and form an immunity against the vaccine; this shows that our current vaccines must also be updated with time. It is important

to understand, that one of the main objectives of Public Health is the surveillance of the policies formulated, depicting the importance of why it is necessary to update those policies with the advancement of time. [8]

Eradicating polio to a large extent, has also provided a ray of hope for many, showing that there is still hope for eliminating other diseases as well. Smallpox, Polio, and HIV are all virus-caused infectious diseases, where Smallpox is now a thing of the past, Polio is on the way of becoming of the past as well. Unfortunately, HIV is still a huge threat to the world. The fact that there are ways to subdue a certain virus, gives hope for curing HIV and many other virus-caused diseases. [9]. In my opinion, it is important to understand that with the proper resources, there is always a solution and cure for life threatening illnesses. Even though polio is decimated, there are still developing countries like Pakistan, Nigeria, and Afghanistan where people are still at risk of the disease. It is essential to know about the reasons why these nations are still at risk is because they have a lack of resources, funds, proper sanitation facilities, and proper drinking water; it might also be they have corrupt government officials, who care little about their country's state. It is imperative for initiatives like the GPEI and WHO to find the root causes of Polio in Polio-bearing nations and work with the government to enact policies that eliminate Polio. Only then is it possible to experience a completely polio free world.

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