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The Drastic Effects of Guinea Worm Disease:

Case Studies in Sudan and Ethiopia

Historical background

Dracunculiasis is the disease of many centuries. According to the World Health Organization (WHO), dracunculiasis was called the "fiery serpent" in the Old Testament (Dracunculiasis – Historical background and important dates, 2011). The disease took place along the coastline of the Red Sea, suggesting that guinea worm used to be a common disease in New Kingdom Egypt (2011). Later on, this was confirmed thanks to the study of Manchester Egyptian Mummy Project, and people started referring to the disease as the Pharaoh Worm (2011). Guinea worm disease was transported through prisoners who crossed the border into Mesopotamia (2011). Here, through carefully studies, many physicians such as Rhazes and Avicienna were able of describing the disease in great understanding (2011). Avicienna also gave dracunculiasis a new name of Medina vein, which meant "dragon" (2011). However, not until the Middle Ages when Carlus Linnaeus, a Swedish naturalist, discovered that the disease was actually caused by parasitic worm (2011). He coined the term "guinea worm" that represents the disease today (2011). Since then, people are more aware of the drastic effects of the disease, especially on health, that they start the process of guinea worm disease eradication (2011).

Dracunculiasis

Dracunculiasis is a parasitic disease caused by *Dracunculus medinensis that* is commonly found in rural villages in many sub-Saharan countries (Greenaway, 2004). Considering that guinea worm disease is the next in line to be eradicated, WHO has worked with many other organizations to reduce the incidence rate of the disease up to 99% worldwide (Dracunculiasis, 2014). By 2013, there were about 148 cases reported back to the WHO, in which 76% of the cases were from South Sudan (2014). Other countries that are still affected by guinea worm disease are Chad, Ethiopia, and Mali (2014). People in most of these countries get sick due to

drinking contaminated water with the worm larvae without knowing (2014). Also, the incidence of the disease is at its highest peak during rainfall season, where there is stagnant water that provides the best reservoir for the worm parasites (Greenaway, 2004).

Figure 1

Guinea worm parasites (Figure 1) release larvae into water stream (2004). According to Greenaway (2004), people who drink contaminated water with guinea worm parasites also take in the parasites' larvae. The larvae, covered by copepods, are released into the body through the intestinal wall, they then travel to different parts of the body (2004). In addition, the female larvae survive longer than the male species, they migrate to the skin area and emerge from there (2004). However, by now, the wound on the victim becomes unpleasant. The guinea worm larvae cause painful blisters that give off burning pain (2004). Furthermore, the wound causes rash and redness that are not pleasant for the host (2004). The host will also experience slight fever, nausea, vomiting, diarrhea, and dizziness (2004). Though also in many complicated cases, people who are infected by guinea worm larvae experience as well abscess formation, tetanus, and septic arthritis (2004). In order to ease away the pain, people normally put their infected wound in water, however, this also creates a perfect opportunity for the larvae to release their eggs into the water, and continue their vicious cycle (2004).

Figure 2

Guinea worm disease is not fatal according to WHO, however, it causes a great discomfort to the victims (2004). Figure 2 is a photograph taken by Pope (2011) of a little girl who got infected by guinea worm disease. Normally, a victim does not show any sign or symptom, not until after a period of about one year of being infected (2004).

Since guinea worm can reach up to 1 meter long, the treatment process is usually painful and takes up weeks (2004). Physicians use a stick to wind out the worm slowly to avoid pain to the victims (2004). At the same time, the patients can also take antibiotics to reduce infection around the wounded area (2004). Furthermore, they need to change their band aid regularly and keep their wound cleaned to avoid other bacteria from invading the wounds (2004). Many people are also infected in many areas, by using this simple winding process, physicians can work on different areas at once to extract all the parasitic worms out of the host (2004). On the other hand, according to Greenaway (2004), many victims who use antibiotics for their wounds can reduce the duration of disability by dracunculiasis by 50%.

Guinea worm disease has a big impact on many people's lives, as well as the economy (2004). The time period when people are infected by guinea worm is during the rainy season (2004). Most of these people also come from rural areas where there is a lack of safe drinking water, they normally drink water from lakes or ponds (2004). Victims of dracunculiasis must stay mobilized for up to several weeks due to the excruciating pain from their wounds (2004). On the other hand, most of these people are farmers who depend financially on agriculture (2004). They usually have to take time off in order to cure their infected wounds, they miss many work days and lose lots of money (2004). Furthermore, children who are infected by dracunculiasis cannot come to school, and miss about a quarter of their school year; they will be lack of the required education (2004). Due to guinea worm disease, the country's economy will go downhill because people do not perform productively in their tasks, they have to abandon their jobs (2004).

In response to the incidence of guinea worm diseases, WHO has partnered with the UNICEF and the United State Centers of Disease Control and Prevention (CDC) to map out a plan for prevention and eradication of the disease (Dracunculiasis, 2014). These agencies

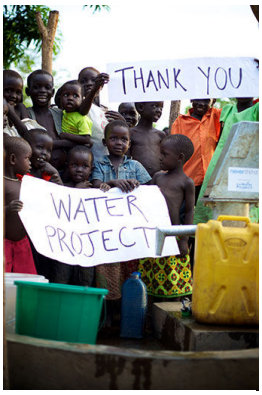

Figure 3

encourage people to filter their water before using it for drinking and cooking (2014). In addition, they will also provide health education classes, and modify people's behavior to practice safer action when it comes to drinking contaminated water (2014). Furthermore, surveillance of the disease needs to be heightened and monitored effectively in order to detect early infection and provide treatment immediately (2014). However, the most important aspect of all is to ensure access to safe drinking water to many rural areas just like in figure 3 (2014). On the other hand, WHO, UNICEF, CDC, the Carter Center, and other agencies also work together to eradicate guinea worm disease on a global scale (2014).

The Battle between South Sudan and Guinea Worm Disease

According to the 2013 report from the Carter Center, South Sudan has 76% cases, equivalent to 113 cases, compared to the rest of Africa (Fighting Disease: The Republic of Sudan and the Republic of South Sudan, 2013). Since 1995, the Carter Center has put a lot of efforts in reducing guinea worm cases in this region (2013). The agency works with many other donors such as Health and Development International, Hydro Polymers of Norsk Hydro, Johnson & Johnson, and Norwegian Church Aid to bring to South Sudan many equipment like pipe filters to help filter the water for drinking, and medical kits to treat the wounds (2013). In addition, in order to get the message across to the local people, these organizations provide health education classes, and launch promotion programs through radio and community demonstrations (2013). By doing so, the locals will have a better understanding on the subject of guinea worm disease; they will change their behaviors in order to promote a better and healthier life (2013). On the other hand, due to civil wars that take place year round, it puts a halt on incoming aid from outside (2013).

Figure 4

Despite all the misfortunes, South Sudan still encourages their people to fight against guinea worm disease, like the example in figure 4 (Geneva, 2014). The volunteers within these communities still stay active in order to prevent and treat the disease (2014). Also, South Sudan offers a new cash reward to hasten the detecting and reporting of guinea worm cases (2014). Dr. Gautam Biswas, team leader of WHO's guinea-worm disease eradication unit, states that this new program will help the local people themselves financially, and physically (2014). The cash reward is offered to everyone who knows of a guinea worm case, or who has the disease itself (2014). For those who bring the report to the health center, they will be given 100 South Sudanese pounds, about $17.5670 (2014). Also, the victims of guinea worm disease can receive up to 500 Sudanese pounds, approximately $87.83, that can help them to survive during the period of recovery (2014). Overall, South Sudan has made great progress in eradicating guinea worm disease; the incidence rate has reduced to 78% in 2013 compared to the previous year (2014).

Nigeria, Free From Guinea Worm Disease

The Carter Center's Guinea Worm Eradication Program works with the Nigeria Federal Ministry of Health since 1988 to lessen the victims' sufferings (Fighting Disease: Nigeria, 2014). The main focus of this program is on health education, with which the agency provides general knowledge and information about the disease to the local people (2014). With the hope to modify people's behavior, the Carter Center promotes safe drinking water in many communities, by providing filtration materials, and treating infected water bodies with ABATE larvicide (2014). In addition, the Carter Center, the Ministry of Health, and their volunteers take surveillance to

keep an up-to-date record on the cases of guinea worm disease (2014). In addition, the government of Nigeria invests in about $50,000 USD in bringing safe drinking water to the rural communities (2014).

As of today, Nigeria is in the process of being certified for having zero cases of guinea worm disease nationally (Down to zero: Nigeria stops guinea-worm disease in its tracks, 2014). Within the country, people are active in promoting the eradication of guinea worm disease (2014). For example, during their house-visit tour, polio vaccinators also monitor the incidence rate to ensure immediate report and treatment for the victims (2014). In addition, since Nigeria is in its final stage of eradication, vaccinators put more efforts in examining households to make sure that everyone is free from the disease (2014). Director-General, Dr. Margaret Chan, emphasizes that the success of the eradication is a joint effort in integrating both the guinea worm disease surveillance and the polio immunization campaigns (2014). The eradication of guinea worm disease in Nigeria has contributes in the increase of social and economic status nationwide (2014).

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