

Environmentology in Pandemic Cinema: Framing Pandemic-Themed Films as a Sub-Genre of the Disaster Film Genre

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ABSTRACT

Environmental issues have become a central theme in many disaster films, reflecting growing societal concerns about climate change, pollution, and habitat destruction. These films often dramatise the consequences of human negligence toward nature, showcasing catastrophic events such as natural disasters, extinction of species, and the deterioration of ecosystems. By highlighting these issues, filmmakers not only entertain but also educate audiences about the fragile relationship between humanity and the environment. Furthermore, the portrayal of environmental degradation in disaster films serves as a cautionary tale, urging viewers to recognize the impact of their actions and encouraging a collective responsibility to protect the planet for future generations. The emergence of diseases has added more challenges for governments to deal with. As such, the pandemic-themed film is suggested as another branch of disaster film genre because it presents a more complex narrative. This study analysed four films with the environmentology theme. The result shows that pandemic-themed films share similarities in their attributes with disaster films and also play a significant role in raising awareness about the urgent need for sustainable practices and environmental stewardship.

Keywords: Enviromental, Disaster Film, Pandemic-Themed Film and Environmentology.

INTRODUCTION

The pandemic-themed film deals with the problem of how human activities like waste technologies and deforestation lead to the emergence of germs that contaminate the environment, eventually causing uncontrollable breakouts that result in mass fatalities. The Plow That Broke the Plains was the first ecological disaster film about environmental issues based on a real-life event. The Great Plains is a place in America that was known for its huge grassland and was cleared by European farmers' settlements to grow agriculture. The clearing of land was massively done without concern for the ecological system. The film shows images of the land clearing with lush growth and prosperous life in the 1920s, and later images show that the place had turned into a wasteland due to overexploitation of the land (IMDb). This film talks about environmental issues caused by greed among farmers without concern for the deforestation that resulted in drought. A film with a pandemic concept, however, has the additional scene that depicts the usage of vaccines and terrifying conjectures about a deadly virus that spreads quickly and may kill one or more people. Through the intervention of the modern system (government, transnational corporations, and society), a deadly virus emerges from pollution and decimates the biosphere. This type of films conjectures about potential future events. The events could prove disastrous for the world economy, particularly in terms of public health, which is closely related to the present viral crisis. The pandemic-themed film is presented via a different lens of calamity which this study wants to investigate. The pandemic-themed film concentrates on the environmentology aspect, which is currently becoming a popular culture.

Background of study

Forward in time, the pandemic-themed film of contemporary times has the transverse features of environmentology: We identified that the environmental theme can obviously be seen. However, the environment theme is a fraction of the disaster film genre. This theme in disaster films is common and focuses on natural disasters such as storms, droughts, volcanoes, and earthquakes that pose a threat to human society

from the outside, which is not because of human contribution. The disaster is beyond human capacity to stop it from happening, and its severity causes human suffering. In contrast, the disaster that this study underscores is a disease disaster caused by human contribution and can be avoided with relevant knowledge. Furthermore, the severity of the disaster conditions can be mitigated or contained through human intervention. By applying the concept to a film study, it gives a new perspective on disease culture that is classically micro and simplified, in which the focus is on the individual that suffers from various diseases such as cancer, leukemia, or an unknown disease as portrayed in *Dark Waters* (2019). Thus, it is argued that because pandemic-themed films constitute an important social challenge and public health issue, they should be prioritized by policymakers, healthcare providers, and the government alike to pay close attention to the process of controlling environmental issues, preventing them, and managing them to avoid severe disasters. All of the processes of human activity are key to the pandemic-themed film. In addition, for the benefit of Hollywood, science consultants must also be involved in the filmmaking process to provide advice on scientific presentation. According to the term given by Fujihira, environmentology involves all human activities in a complex process that started with history. In order to understand any issue, it is important to understand the root cause. Only then can the issue be resolved by working on the process to find a resolution to make it better. The concept of environmentology can be applied in all aspects, as suggested by Fujihira, but is not popular among researchers except in business studies to study Honda's environmentology. The concept applied by Honda was to give "an ongoing commitment to environmentally responsible technology" by categorizing its environmental initiatives under seven domains: product development, purchasing, production, transportation, sales, disposal and recycling, and administration. To understand what a pandemic-themed film is, it is essential for audiences to have knowledge and understanding about viruses, and to realise that the society's ignorance is one of the reasons pandemic disasters happen. This study attaches a repertoire of disaster images that could happen in the future, which is important for all of society and government to prepare for. Moreover, the distress images deter them from managing the environment well for the well-being of people. Under this film theme, environmentology works like a framework that has a few attributions.

Understanding the meaning of environmentology is necessary before discussing it in this research. The Japan Environmentology Institute works to address environmental issues brought on by human activity. The scholar Fujihira (2001), who coined the term, explains that the environment exists in all human activities, including environment biology, environment chemical, environment economy and law, social environment, as well as environmental ethics. The environment problem cannot be resolved individually; it needs collaboration between domains. One of the domains is the use of film to make people understand environmental issues. The twentieth century saw an enormous rise in human activities. From 1.6 billion in 1900 to over 6 billion in 1999, there are more people on the planet. The amount of energy consumed, which is frequently employed as the rate of increase in abundance, exceeded that of the global population. A rise in human activity has also led to an increase in wastes of various kinds, such as nuclear waste, gases from burning fossil fuels, metals, and synthetic compounds. The waste that is released in the largest amount from these sources is carbon dioxide (CO₂), which is created when fossil fuels are burned. Oceans and plants absorb some of the CO₂ that is released into the atmosphere, but the remaining portion builds up in the atmosphere. As a result, the amount of CO₂ in the atmosphere has been increasing since the media informed us that global warming causes a rise in sea levels and an increase in abnormal weather (Fujihira, 2001). Therefore, history must be included in environmentology in order to fully understand the term human activities, as tracking human history provides important context for understanding human behavior. Recalling the Soderberg and Scot Burn interview for *Contagion* (2011), both directors used scientists as sources of information to create films on the virus pandemic because they understood how it began, where it was going, and how it would end—all of which were connected to human activity. According to Fujihira's article, the environment and ecology are harmed by the economy's rapid growth. First, it was evident that the natural environment was being destroyed by land development. Large-scale businesses and harbor facilities were constructed along the coast, destroying the scenic shorelines and industrial zones. The unplanned home development damaged the outer forests. Furthermore, every time a road was constructed countrywide, the surrounding ecology suffered greatly.

Degradation of the environment, such as the destruction of animal habitat for development, followed the destruction of nature. The virus that can infect humans originates from animals. Recently, in 2021, the Yezo virus infected fourteen Japanese people. A scientist found that deer tick bites were the cause, and the scientist

discovered that the virus is in raccoons and Hokkaido Sika deer (Newsweek, 2021). This evidence shows that the animal habitat is a dangerous place and should be preserved as it is. In addition, the liquid waste from homes and industries causes rivers, lakes, oceans, and marshes to become dirty and smell bad, which can also be hazardous to human health. Hazardous chemicals found in liquid waste from companies, including arsenic, mercury, cadmium, and PCBs (polychlorinated biphenyl), poison the water. All these human activities are important scenes to exhibit in films, but they are absent in either thrillers or disaster films. Hence, these human activities are essential scenes to highlight the cause of the pandemic. Fujihari also explains that the solution to a problem is a technology. In the case of the pandemic-themed film, a vaccine is a technology that is used to cure diseases.

This research also identified that contemporary pandemic-themed films are considered recycled from similar themed films in the past. Therefore, the recycle theory by Amanda Klein (2011) was adopted. She claims that the American film cycle, also functions to broaden the understanding of the established or non-established film genre as well as to shape or disseminate new issues or sub-cultures. The most popular film cycle is the disaster film genre. Stephen Keane (2006) listed the disaster films that occurred in three cycles; the 1950s, 1970s, and 1990s, based on the issues we live in at that time. Neale (2000:9) defines the term 'cycle' as 'groups of films made within a specific and limited time-span and founded, for the most part, on the characteristics of individual commercial successes'. In terms of commercial success, Keane agrees with Neale that the industrial factor is one of the factors in producing disaster films. If one disaster film hits the box office, another studio will likely produce their own versions, such as *Dante's Peak* (1997), produced by Universal Studio, and *Volcano* (1997), produced by 20th Century Fox. Both films are appealing because they reflect the situation at that time. Many disaster films with volcano themes were produced during this time, as the 1990s were proclaimed the international decade for natural disaster reduction by the United Nations. The decade of the 1990s reported 65 eruptions from 52 volcanoes worldwide (Brown et al., 2017) that inspired the filmmakers to produce such films. According to Keane, "In order to appeal to audiences, films must also reflect the times in which we live. With particular regard to disaster movies, they are said to be borne out of times of crisis. Whether human or environmental, alien or invasion, most of all, disaster movies provide for solutions in the form of a representative group of characters making their way towards survival" (5). Keane writes that their characters do not always survive in the movie: "The most accomplished disaster movies remain true to the indiscriminate nature of the disaster, both fulfilling and shattering our expectations and illusions" (38). Keane suggests that disaster films are appealing partly because of a combination of issues that constitute a disaster genre. Despite the vast topical themes, the term pandemic is considered in its infancy because it is not widely understood by many people.

Although the pandemic-themed film is not recent and has no proper genre yet, we believe that it is necessary to have a genre for the film. The pandemic-themed film which grounded on environmentology narrative serves as a powerful medium to raise awareness about public health crises, highlighting the importance of preparedness, response, and unity in the face of such challenges. They can educate audiences about the risks associated with infectious diseases, promote empathy towards those affected, and encourage discussion on global health policies which differs from virus outbreak films, zombie films or eco-thrillers film. Additionally, they provide an opportunity for filmmakers to explore complex human emotions and societal dynamics during times of crisis. Establishing a genre for pandemic-themed film helps viewers know what to expect and allow filmmakers to explore various aspects of the topic more effectively. It also enables audiences to engage with the films in a meaningful way, understanding the common themes, tropes, and messages that emerge within the genre. Moreover, it helps scholars and critics analyse and discuss these films within a specific framework, facilitating deeper understanding and appreciation of the genre's impact on culture and society. Thus, research on this topic is required in order to define a genre. Moreover, the majority of academics who talk about pandemic films or issues associated with them rarely bring up the topic of a pandemic-themed film genre. This study aims to do that as a result. Although it is not feasible for film practitioners to establish a canonical genre, film scholars are able to do so. Here are a handful to mention: parkour films, necrorealism films, and road movies. These films are uncommon and belong to several different subgenres. A pandemic-themed film shares many traits with a catastrophe film, but it doesn't rely on computer-generated imagery. Due to these differences, this study intends to close this gap by broadening the definition of the disaster film genre and accounting for pandemic-themed film as a subgenre of disaster because of some shared characteristics. The

four films used in this research were governed by the environmentology issues in their narrative and formalist conventions. This research intends to find out what the attributions are in order to establish a pandemic-themed film genre and how different it is from the thriller and the disaster genres.

LITERATURE REVIEW

Natural disaster narratives usually surround themes like earthquakes, volcanoes and hurricanes which facilitate a major theme of geography. On the other hand, the narrative in the pandemic-themed film presupposes human activities that contribute to the almost collapse or total collapse of the public healthcare system anticipated by the pandemic. Human activities or environmentology is associated with all aspects of human activities, in particular, related to the theme of losing trust in institutions such as health authorities and the governments for hiding information about viruses. The four films that are used in this research, discussed the concepts surrounding the concepts of environmentology such as the destruction of ecology initiated the birth of pathogens that later developed into an uncontrollable outbreak. The narratives in these films surround the issue of the environment but pivot their content to human-environment interaction that describes the plot of the film.

According to Baker (2013), most Hollywood pandemic-themed film conventions are within the issue of environmentology which is related to human activities that become popular culture. One of the popular sub-genres of disaster films is the environmental theme which causes destruction to society and the planet earth but this disaster is not caused by human activities. Rather, it is caused by nature or in theology studies is interpreted as works of God either as punishment or reminder. However, the depiction of natural disasters such as earthquakes, climate change, etc. is a tiny fraction of environmentology as the humanities aspect which is a similar domain to environment is left out. What is 'environmentology' and how does the term fit into this study? The word environmentology is complex and can be defined as follows: "a systematized science whose purpose is that human beings control their activities appropriately on this finite earth." The phrase "on this finite earth" means that we need to understand the earth and the natural environment; therefore, the fields of study including geophysics, geochemistry, climatology, biology, and physical geography are necessary. In reference to "human beings", sciences which help understand humans, such as anthropology, primatology, brain science, cognitive science, and philosophy are necessary.

The term human "activities" requires history to enter into environmentology because tracing human history brings us useful knowledge about human activities (Fujihira, 2001). Human activities contribute to environmental issues because in order to have civilization, the clearing of forests for development is inevitable. Harbors and highways were constructed to connect cities for facilities and factories. All forests along the highways were cleared and small towns emerged as a support for nearby cities' economic activities.

The pollution to the environment follows the destruction of nature that raises global concern on public health. The waste and chemicals from factories and households contaminate the river, lakes, and seas resulting in environmental contaminants as it damages human health. The smoke from factories' chimneys has worsened the environmental condition. Recent evidence found that fluorochemicals, arsenic and mercury can intercede the immune response in humans and in some cases decrease the immune response to vaccines and make them defenseless to infectious disease (Erickson, 2019). For instance, high levels of arsenic cause chickenpox virus, shingles, lupus, and hepatitis. The lethal disease makes pathogens more virulent to antibiotics such as SARS, H1N1 and Zika. According to Guangdong CDC Chief Expert CDC, SARS cases have made the Chinese government more communicable of the dangerous virus and the prevention act. The government also held a press conference to release SARS-related information to the public (Heng Xu et al, 2004). However, a pandemic narrative did not highlight all these chain reactions in pandemic films. This study suggests that all the processes, beginning from the virus caused by the environment, followed by the transmission of information from the government to the members of society, and how to act and what to do, should be present in all the films related to the pandemic theme.

Environmental issues such as deforestation and waste technology have been discussed by environmentalists and scientists because these factors are the main contributors to water and air pollution. In some cases, the pollution by chemical hazard has caused illness and death. However, this issue was not openly discussed although it has inspired many Hollywood filmmakers to transport the event to the big screen.

Governments have been idle on the issue of environment and pollution, and in fact it is the hardest thing for a practicing politician to understand how important the issue is to public health. The report released by WHO (2015) found improper waste management can affect both public health and the environment. Various studies in Europe on residents living in proximity to waste disposal have reported that about 2% to 6% of resident population might suffer direct and indirect health effects, including an increased risk of cancer and mortality, respiratory disease, congenital malformation and low birthweight and wellbeing. Another environmental issue that contributes to disease is deforestation. Serge Morand from the French National Centre for Scientific Research says deforestation can increase health crisis because the forest as a biodiverse habitat for animals functions as a barricade from disease. When the forest is replaced by plantation expansions, the specialist species vanish and rats and mosquitoes burgeon to become pathogens and spread to humans and animals' habitats. For instance, diseases such as malaria outbreaks in Brazil, Ebola in West Africa, and several diseases in South America where *Anopheles darlingi*, a mosquito type is a vector, are evidence that viruses are easier to transfer from animals to humans when their ecosystems are disturbed (The Guardian, 2021).

According to articles in eco-business, a report from Fern, a Brussel-based NGO, and reviews from fifteen companies including IKEA, Nestle, Unilever and others, the governments of the countries where commodities productions occur did not clearly explain how to go about deforestation limitation and how to have a limited impact. As an NGO, the Fern report states the need for "creating an enabling framework of rules, regulations and effective administration without which private sector commitments to tackle deforestation can only have limited impact". This report suggests that the government must be sterner in its policy on deforestation as well as pollution. In addition, the lack of research on these issues has made both waste technology and deforestation seem to appear less hazardous which causes idle government regulation policies on waste disposable technology and deforestation. With all of these environmental components, it drives to pandemic as conclusive term.

METHODOLOGY

This study employed content analysis method. The common issue faced by the world today seems to be echoing in Hollywood's pandemic-themed films. These films deal with the scientific underpinning in their narrative and key plots. The science-based premise is mentioned artistically in them. The narrative conventions of the films are built upon these issues: (1) the fictional viruses were inspired by scientific phenomena that release toxins in response to changing environmental conditions such as from existing viruses such as SARS, Avian flu, rabies, or chemical and biological pollutants that cause contamination of water bodies from cell to ecosystem that kills living organisms and affect our health. The fictional virus appears at the beginning of the films where we can see the process of the outbreak; how the virus starts and how the virus transfers or jumps to other victims. (2) Images of victims are presented as healthy, joyful, and full of life before being infected. The portrayal of the victim is likely to present sick people as gravely ill and he or she is not going to turn into a zombie. The scenes in these films show 'realistic' sufferings of the victims from virus symptoms such as cough, seizure, shortness of breath, and haemorrhage. By portraying images of fictional viruses and sickness, which are assisted by the scientists who were hired as consultants on the scientific facts of the films, the pandemic-themed film reflects realism which is not found in zombie films. The pandemic-themed film shares similar convention with the disaster film genre by portraying escapees suffering in order to stay alive. However other conventions are dissimilar. This study used four films: *Contagion* (2011), *The Craziest* (2010), *Carriers* (2009) and *The Happening* (2008) and compare whether all of them share similarities in its attributes. The following topics discuss the elements that become attributes to the pandemic-themed film narrative.

Analysis

The pollution which is caused by humans could be read as semi-intentional because of two reasons; the first is human error and the second is the need for development. Development by land clearing whether it is planned or unplanned gives destruction to the ecosystem and the societal system of man. These problems yield the birth of pathogen and pesticide that later grow diseases and infect humans. Another issue of environment is water pollution. When pollutants get into water bodies, it can lead to pollution. Any compounds that are harmful to human or environmental health are considered contaminants. Human activity is the main cause of most

pollutants in water. Surface water, such as rivers and lakes, can get contaminated due to several factors such as acid rain, pesticide runoff, storm water runoff, and industrial waste. Muralikrishna defined Environmental Pollution as “the contamination of the physical and biological components of the atmosphere system to such extent that normal environmental processes are adversely affected” (2017). *Contagion* (2011) and *The Craziest* (2010), are among the films that reveal the involvement of a giant company in forest clearing activities and chemical waste that causes outbreaks. According to the Gideon epidemic database, a study from 1990 to 2016 found there were 3884 outbreaks of 116 zoonotic diseases mostly carried by mosquitos and flies as these insects are vectors for several other diseases (Watts, 2021). In *The Craziest* (2010) the pollution is caused when a military airplane carrying Trixie chemical crashes into the river and kills the pilots. The sheriff and his assistant suspect the chemical has polluted their source of drinking water, causing some of the residents to suffer a mysterious sickness that eventually kills them after drinking the water. The toxic water that seeps into the towns’ groundwater causes sickness and people become killer maniacs. In the DuPont case, the chemical PFAS (polyfluoroalkyl substances) was widely used in many products including cosmetics and military equipment for decades (Time, 2019).

In *Contagion* (2011), the film depicts that the Transnational Company where Beth works contributes to the environment issue where the company is involved in deforestation that destroys and pollutes the animal habitat and the birth of the virus starts from bats that consume the polluted fruit and drop their waste in the pig farm and the waste that contains the virus is consumed by the pig and the virus is transferred to a human (the host) and infects others and becomes a pandemic. *The Craziest* depicts the idling causes of a major destruction. Within ten minutes into the film, the sheriff and his assistant discover that a military airplane carrying Trixie chemical has crashed into the river, killing the pilots. Both men suspect the chemical has polluted their source of drinking water, causing some of the residents to suffer a mysterious sickness that eventually kills them after drinking the water. However, the military authority and the government are silent and do not inform the town residents about the chemical pollution, despite three minutes into the film scene and shots of a few military groups already in town investigating the cause. Issues on pollution are not new and there are countless conference discussions but there is no serious action taken. In the film, the small town citizen is seen as opposed to newcomers, change, and outside authority. The secrecy displayed by the military group in the town can also be read as an attempt to avoid panic among the residents. It can also be read as unimportant lives to be saved, as the United States probably sees their involvement in the agriculture business as technically having less contribution to the country's GDP. Despite the various interpretations, the researcher sees that the government lacks sensitivity in the pollution issue and shows little effort in controlling pollution. In *The Craziest*, the chemicals pollute the drinking water, and the citizens are diagnosed with a rare blood virus, which turns them into killer maniacs. The government knows but stonewalls the information and tries to salvage the health situation in Orgen March but has no success. Therefore, demolishing the town with the people in it is the best solution, which suggests being idle is not an alternative in the context of civilized government. Moreover, in *The Craziest*, the delayed action taken by the government dealing with the waste technology that accidentally polluted the drinking water of the residents is a depiction of the wait and see approach because they are uncertain of the situation and decide to wait before taking any action which in turn results in an uncontrollable outbreak in the fictional town of Ogden Marsh.

Pollution caused by poison tresses is highlighted in *The Happening* by the director and screenwriter M. Night Shyamalan. He says the idea of his film was based on the plants that release an airborne toxin that rewires the human brain. Some plants are poisonous to humans and animals. Most poisonous plants can be found in the forest as well as council gardens and if humans or animals have contact with them, ingestion plants can cause sickness or death. Conium or hemlock which can be found in Greece can result in death after disrupting the body’s neuromuscular junctions beginning from a person’s legs and moving up the body until it reaches the respiratory muscles (Gonzales, 2011). The plant Oleander can be found everywhere in America and contains chemical cardiac glycosides which can cause cardiac arrest. In *The Happening*, the plants contain neurotoxins that trigger a reverse-survival instinct by prompting people to kill themselves (Hart, 2008). *The Happening* does not highlight the disease's origin explicitly but it is mentioned in the dialogue between Elliot and the nurseryman. The disease is horrendous as it is spread airborne. For example, series of scenes show people committing suicide in most big cities across America, either by jumping from tall buildings or killing themselves using sharp objects. The scenes suggest that the virus from plants can be toxic and contagious.

What does the rise of these cases tell the American society in particular and the world society in general about the shortcoming of governments being idle on such issues? Pollution caused by waste technology such as chemicals is a global problem that requires cooperation from many groups (producers, governments, and researchers) to outline protocols to solve this problem such as to inform policy formulation and adoption.

All films except *The Happening* show the government's inefficiency in communicating about pandemic safety. In *The Happening*, after fifteen minutes into the film, the government authority has instructed the schools, offices, and economic activities to close down. In fact, to protect from further damage, the government is seen using traditional media such as television and radio to warn the public about the pandemic, and instruct them to practice home quarantine as well as keep giving updates about the situation from time to time. Despite the government's order to stay home, many city dwellers who choose to leave New York cause chaos because as they are leaving the city some of them are infected by the virus and die. The short-lived virus disappears within twenty-four hours causing a debate among scientists on this unusual phenomenon which is shown on television.

Environmental issues are now a public health concern as most viruses originate and mutate from contamination in animals, plants, and water, and are spread through the air. However, little research found that outbreaks were accelerated by environmental pollution. For example, Cui et al found that someone living in a highly polluted area of China was more than twice as likely to die from SARS as someone living in an area with cleaner air (2003). During the SARS epidemic in 2003, Kan et al (2019) found that increases in particulate matter in air pollution increased the risks of dying from the disease. An article in *Scientific Reports* wrote that researchers have found that several viruses, including adenovirus and influenza virus, can be carried on air particles. Zhao et al found that particulate matter likely contributed to the spread of the 2015 avian influenza (2019). A similar case was shared by Chen et al (2017) who found that air pollution can accelerate the spread of respiratory infections.

The involvement of science consultants in American films started in 2009 after the National Academy of Sciences was established to provide some expert advice in feature films, TV shows and video games (Logan, 2016). The scientists help filmmakers reunite science logic with fictional or fantastical logic with the intention of making the stories believable. According to Kirby (2011), science consultants make science presentations in a film plausible by negotiating scientific accuracy within production limits. As a result, the film becomes significantly fictitious reliable. Involving professionals like scientists makes the story look educational, believable and compelling. Kirby also elaborates that those scientists' jobs are to check, and shape visual iconography and provide some guidance for accurate science facts. They infuse reality in fantastical storylines. For instance, the narrative in pandemic-themed films is surrounded with the issue of environmental pollution as the principal theme.

According to the World-Wide Fund for Nature (WWF) report, it is expected that eighty percent of world forests will be lost by 2030 if the current trend continues and no action is taken by local governments. These ecological landscapes are located in the Amazon, the Atlantic Forest and Gran Chaco, Borneo, the Cerrado, Choco- Darien, the Congo Basin, East Africa, Eastern Australia, Greater Mekong, New Guinea, and Sumatra. They are not only the forest homes for orang-utans, tigers and other wild animals but they also function as the world's biodiversity, and destroying the forest is like destroying the ecosystem as well (2021). Although the inaccuracies distance these films from the real facts, the knowledge from the science advisor might enhance the science presented in the films.

The fictional viruses in the films are caused by various pollutions and in some cases, shape the pandemic narrative in some ways imaginable. Dr Ian Lipkin, a science advisor for *Contagion* said the film provides information about the challenges faced by public health in the 21st century due to "increasing international trade and travel, urbanisation, loss of wildlife habitats, and inadequate investment in infrastructure for surveillance and vaccine production and distribution". He suggested the *Contagion* plot displays how the outbreak of a virus on occasion, migrated from animals to people. The zoonotic virus spread from animals like fruit bats that cause illness in pigs and humans. Beth the first pandemic victim gets infected after she meets the chef in Hong Kong. The chef earlier on has prepared pork that is polluted with bat waste and he later greets Beth without washing his hands. Beth then meets a few people in the casino and those who touch what Beth

touches are infected and all of them die after they reach their home countries.

These scenes are displayed in *Contagion* as a flashback to indicate how the virus started. The scene shows that deforestation was the cause where the fruit bat's habitat was destroyed, and the bat then dropped the waste on pigs. The infected pig was brought to the restaurant where the chef worked, and the virus was transferred to Beth. According to the CDC, this is how the Nipah virus was transferred and the outbreaks reached Asian countries, especially India and Bangladesh, and within eight months the virus had killed more than a hundred victims. Based on this fact, it inspired the filmmakers to produce *Contagion*. The pollution issue in *The Craziest* highlights water contamination caused by the bio-Trixie chemical. Touching the concentrated chemical will cause severe black burns on the skin, and can blind a person within minutes (Chemical security Organisation, 2002). The film shows the contaminated water turning the people of the town into killer maniacs.

Water pollution is another issue that is not widely covered by media especially in third world countries due to the cause of the pollution involving giant companies. This issue should be given attention so that the companies would not simply release their waste without any sort of treatment. Substantially, about 1.7 million people die each year due to unsafe water, sanitation and hygiene (WHO, 2002). In contrast to *Contagion*, *The Craziest* was inspired by the issue of water pollution. The film shows two different scenes. In the first scene, a man walks into a baseball field brandishing a gun with the purpose of killing the sheriff. In the second scene, a father locks his wife and son inside the house, lights a fire, and kills them. The unusual behaviour indicates that both men have been infected with the virus after drinking some water contaminated with Trixie, a biochemical poisoning that evolved into a contagious disease.

The film *Carriers* depicts a horrifying contagion of unknown origin that ravages the entirety of America, killing nearly everyone. Experts in epidemiology claim that just twenty individuals in any population are responsible for 80% of the spread of infectious diseases (Perlman, 2016). Ten minutes into the movie, the protagonists are shown walking through deserted towns and streets, indicating that the infection is asymptomatic. The viral pandemic in *Carriers* depicts that the last two decades' diseases mostly involved respiratory viruses that impact tuberculosis and the lung. A person will get respiratory infections when the infected person coughs or sneezes. The scenes in the film occasionally show actors wearing a mask as protection from an airborne virus.

Meanwhile, the pollution in *The Happening* is a toxic neurotransmitter released by plants that cause disorientation. The beginning and ending scenes show how the virus infects and disorients the public to kill themselves. The director and writer of *The Happening*, Shyamalan consulted the science community about whether his idea is possible regarding the plant communicating and releasing toxins. What if the environment caused by pollution became an enemy that can kill us? According to three botanical experts, *The Happening* 'is sprinkled with kernels of truth that have been wildly exaggerated for the benefit of Shyamalan's story'. For instance, in the scene when the nurseryman tells Elliot about the plants which can communicate with each other and release toxins, this is possibly happening because diseases could have been caused by plants that would be able to infect human health. Professor Armstrong a botanist from University Illinois said under some circumstance's plants sense the presence of other vegetation through photoreceptors and chemical means and might send out volatile hormones when they are attacked. This scenario was displayed in a prairie scene where Elliot and groups of people are attacked by the virus from the plant and most of them die from the toxin. According to Roossinck (2015) wild plants viruses are usually asymptomatic.

In *The Happening*, a few scenes show the virus is asymptomatic as it speedily infects people, usually happening outdoors such as in the prairies or parks. The root cause occurs when the virus ecology which is closely tied to the ecology of their vectors, and the behavior of insects, which is critical for the transmission of many plant viruses, is impacted by virus-plant interactions. The scene in the nursery explains how the virus spreads when Elliot is told by the nursery worker that the virus turns virulent when the host virus distributes the virus, particularly in an area where grass grows. Based on research conducted on grasslands in California, it has been demonstrated that invasive plants can accelerate the spread of plant viruses by drawing more aphids to the area. These aphids then transfer the virus to the more vulnerable native grasses, leading to the death of native grasses and facilitating the invasion of alien species (2015).

DISCUSSION

Of all the disaster films, the pandemic is the least essential because issues related to disease outbreak are foreign to the audience, therefore filmmakers have the view that there is no necessity yet to produce this kind of film. However, there was a change in perspective after the millennium. The pandemic film releases after the millennium are likely to present fictional viruses that correspond with actual viruses around the world. Briggs and Nichter (2009) pointed out that the 21st Century pandemics—SARS, Avian Flu, Ebola, pandemic influenza—are marked by what they refer to as bio-communicability. The term means illnesses that are caused by an infectious agent (virus) and spread through transmission of that agent from some infected animals, humans or inanimate reservoir to a susceptible host (vector or lifeless environment). The media brings the knowledge about the pandemic to the general audience and filmmakers use it to produce a pandemic narrative in various genres (science fiction and horror, like zombie movies). Patricia Wald (2008), in her book "Contagious: Cultures, Carriers and the Outbreak Narrative", pointed out that the pandemic narrative influences how global infection and public health are perceived as important to be grasped by the public, filmmakers and public health scientists. The results from this study supports this by showing that the pandemic-themed film has five attributions in its narrative: deforestation, pollution, public healthcare, the idle government and science consultants that are able to connect medicine, politics and myth with global modernity, which can relate to the contemporary situation. The disaster film genre is usually characterised by disaster that is caused by natural disaster or human error. However, the pandemic-themed film can be characterised as a grand narrative as the plot is more universal. For example, images of a terrified society and slow government response to a pandemic situation reflect the incompetent government in handling a health crisis. In *Contagion*, images of people around the world infected are presented in a mosaic technique to indicate that the virus has spread in all continents and the local governments fail to communicate about disease protection to the public, which worsens the situation after too many casualties are reported. High numbers of deaths indicate the catastrophe in the health care system. According to WHO, a similar experience was faced by the West African governments when the Ebola virus killed thousands of people and infected another thousands forcing them to ask for assistance from the WHO and CDC. These bodies have implemented public health measures that have resulted in rigid policies to prevent the spread of viruses. These measures include travel restrictions, school closures, and social and economic lockdowns. All films used in this study present those measures in scenes throughout the films' running time.

A pandemic narrative is presented as an unfolding crisis, and it reflects our world's technological capacities and its interdependencies. Public healthcare is the implicit issue highlighted in *The Happening*. The film discusses pollution that can be dangerous to public health. Despite the presentation of pollution not being apparent throughout the film screening time, the close-up of tresses, clouds, and the sound of wind at the beginning of the film symbolise change or transformation because of its dynamic and changing nature, suggesting some nature disruption caused by wind and tresses. Most scientists believe that trees can be healers and poisons at the same time. Plant life has responded to environmental damage by releasing an unidentified toxin into the sky. People are under the influence of that toxin, which makes them want to commit suicide on their own. Choosing a virus that originates from plants is an interesting concept in the pandemic-themed film, as the use of plant toxicity is a new approach. The self-killing displayed in the film could seem acceptable, symbolising mental health issues, which are mainly a problem among people in big cities like New York.

Contagion highlights the importance of understanding the danger of the transmissible disease and its incubation period. In *Contagion*, it is shown in the scene where Dr. Mears explains to her team, "If a person has contact with the infected person within 48 hours and shows no symptoms such as fever, cough, or any sickness, that person is healthy and not infected." She also highlights cleanliness and how it is compulsory to observe standard operating procedures to avoid virus infection. The epidemiologist Dr. Ian Lipkin, in the interview with *Hardtalk*, says that the "purpose of this film was to stop something similar from occurring." Dr. Lipkin served as the scientific advisor for the movie that, nine years ago, foresaw a situation that remarkably mirrored the current Covid-19 outbreak. He says that the virus affects the lungs and brain, and the mortality rate could be around twenty to thirty percent. Furthermore, the film shows that vaccines can help boost the immune system of a person. Dr. Paul A. Offit, M.D., a University of Pennsylvania professor of vaccination, agrees, "It's your worst-case scenario." The illness that is shown is communicative and results in a deadly case

of encephalitis, or brain inflammation. It is comparable to airborne rabies in that it is extremely difficult to contract but, if symptoms appear, can be fatal.

However, there are certain parallels about the fictitious virus's genesis. The sequence of events leading up to the virus's birth is shown in the film's closing moments: a bat gets displaced when a tree is destroyed by bulldozers. The bat slips a slice of banana from its jaws as it flies over a pigsty. When a pig consumes the banana chunk, it absorbs the bat virus. Beth becomes patient zero when the pig is later killed and cooked by a chef who doesn't wash his hands between handling the carcass and shaking hands with her. This spill-over event clearly explains how the majority of viruses require a "bridge host" to function as a go-between, which in the case of Contagion is a pig and a bat.

The second point is about the hygiene issue, where, in their unguarded moments, the standard of hygiene and cleanliness is not followed. For example, Contagion shows the pandemic process in a flashback, which symbolically shows uncleanness as the cause of the virus spreading. In the scene, it shows the chef, just wiping his bloody hand after chopping an infectious pork and later, handshakes Beth's hand. Beth later mingles with a few people from different nationalities in the casino after her work is finished, before returning home without realizing she was infected with a virus. From a foreign land, the virus spreads through human mobility, and Beth, as the host, spreads the virus throughout the United States and worldwide, as people who are in close contact with Beth are also infected with the disease and later infect others. The outbreak then turns into a pandemic and therefore requires global attention and cooperation in battling the virus. This short scene explains that a small mistake, like not washing hands, can cause a disaster.

The third crucial point that Contagion highlights is the difficulties society face when dealing with a very deadly illness that is spreading quickly. The film director, Steven Soderbergh, depicted a realistic medical and public health reaction to a serious outbreak. Many of the technical public health parts of the movie are realistically portrayed; for instance, in the last scene, the disease transmission channels shown in the movie are believable, and the scene where CDC and WHO authorities' primary concerns are correct and genuine. Relevant remarks regarding the epidemiological inquiry and such fundamental infection control practices as social distancing and frequent hand washing briefings given by Dr. Mears are correct too. Considering how deadly and rapidly spreading the virus is, it is also plausible that there may be societal unrest and public panic, as depicted in Contagion. In a scene where the vaccine was prepared, the distribution of the shots is portrayed as unfair since wealthy nations are given preference, which the current pandemic has shown to be true. That scenario may heighten the dramatic effect of the movie, but it does not accurately depict the laborious procedures that are actually employed to assign and prioritize the few medical counter measures that are likely to be available, especially in the early phases of a public health emergency.

Another issue seen in the films used in this study is when strict rules are imposed to protect public health, and making decisions in a real-life situation, such as imposing isolation and quarantine rules. The public sees that the rules are disturbing and challenge their liberty. The ethical principle of the public protection guideline suggests that it is always placed on accomplishing the greatest good for the largest number of people in a given community.

The government's preparedness for infectious diseases is debatable among science communities. The collapse of the healthcare system was the highlight of the movies, where thousands of healthcare workers are dead and unable to treat the virus victims, and the hospitals are full of patients, almost all of whom are untreated and do not survive such as in Carriers, The Craziest and Contagion. The use of the stadium and schools as temporary hospitals suggests the severity of the un-functional healthcare system and the failure of the government to handle the situation. Regardless of whatever dramatic license that may have been taken with how a deadly virus might be spread or contained, hospitals, medical professionals, and public health agencies will be on the front lines of a major deadly disease outbreak. Therefore, according to Gabor Kelen, M.D., Director of the Johns Hopkins Office of Critical Event Preparedness and Response, they should be well-trained and equipped to react. The situation depicted in the film looks unlikely, but the recent pandemic of Covid-19 has proven that in most countries, healthcare workers are not well trained and the healthcare system is not well prepared. The data from WHO showed the official global death of Covid-19 on December 31, 2020, exceeded 3.4 million people (WHO, 2020). As suggested by Kelen, one of the main problems is the capacity to segregate infectious

individuals. A clear set of policies is also necessary for physicians and other healthcare professionals to make quick, moral judgments about the distribution of supplies, medications, and personnel in the event of a significant emergency involving a sizable patient population. These films especially the Contagion can be seen as a reminder for every country's public healthcare for future pandemics.

CONCLUSION

Although environmentology in the pandemic-themed film has close similarity to other disaster films in portraying the destruction of disasters, these films exhibit scenes that show the impacts of virus in different angles. All the films exhibit that the viruses happen because of either idiopathic environmental intolerance, which means the development of multiple symptoms that people who have them believe are caused by exposure to any number of identifiable or unidentifiable chemical substances (inhaled, touched, or ingested), or zoonosis, an infectious disease that has transitioned from a vertebrate animal to humans. Zoonotic pathogens can be bacterial, viral, or parasitic and can spread to humans by direct contact with domestic, agricultural, or wild animals, or through food and water (WHO). In addition, all the films display everybody in a quandary state because the virus is foreign to them, and as a matter of fact, it is the government's responsibility to resolve them.

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