

Current Issue in Tourism: Disease Transmission as a Potential Risk for Travellers

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ABSTRACT

In reference to the World Tourism Organization (WTO) statistics of 2015, international tourist arrivals reached 1.2 billion. Statistics revealed that 55% of tourists were leisure and recreation travellers. This current volume and scope of travel is unprecedented, and the consequences extend to include the hosted geographic areas and the ecological system. Since the migration of humans has been the pathway for disseminating infectious diseases throughout the history, and travel is an influential factor in the emergence of disease, it will continue to shape the emergence, frequency, and spread of infections and diseases in different geographic areas and populations. International travel and tourism can pose various risks to health in areas that lack hygiene and sanitation. The paper aims to focus on the impact of some contagious diseases that pose risk to tourists and threaten the public health, and to raise awareness to such issues that will lead to enhance travel safety.

Keywords: Tourism, Risks, Diseases, Current Issue.

1. INTRODUCTION

The global economic recovery and the emergence of new source markets have led to a significant growth in the volume and size of global tourism between the years 2009 to 2014. International tourist arrivals increased dramatically from 25.3 million in 1950 to 1138 million in 2014. The World Tourism Organization (WTO) estimates the growth in travel by 6% yearly. It is also anticipated to grow on similar rates in the upcoming decades as indicated in United Nation World Tourism Organization (UNWTO) 2014 report.

The statistics of the report reveals a faster growth rate of (5.4%) for the international markets than (4.9%) for the domestic market. The sturdiest growth for the domestic and international travel combined was recorded in the Middle East (11.4%) followed by Asia-Pacific (7.1%), Latin America (6.3%) and Africa (5.2%) whereas the slowest growth was recorded in the developed markets of North America (2.3%) and Europe (3.8%). The areas with significant growth in tourism include many developing

countries in tropical/subtropical regions that are characterized by a variety of flora and fauna, poor infrastructure, lack of cleanliness and purity of water and sanitation, and poor pest control. These attributes increase the likelihood exposure to local infections and diseases.

International travel represents a significant risk factor for contagious diseases since travellers can easily carry them from one person to another to any spot in the world, and the shift in travel to the less developed regions has made travellers vulnerable to prevalent diseases in those regions as experienced recently with Ebola virus. Political instability and disease outbreaks play a major role in choosing a travel destination. Yet, it is very difficult to stipulate the effect of the current dramatic changes in the global economy on the number of travellers and on the favoured destinations (Bintarsih & Suhardjo, 2018).

Although general precautions taken by travellers to any destination with high risk factor can greatly reduce the risk of exposure to infectious agents, travellers still play a critical role in the movement of microbes globally. In a highly urban populated low-latitude area, new threat and infectious diseases emerge by which microbes spread rapidly than expected and for which vaccinations neither protect nor exist. e.g. Ebola virus.

Since the geographic distribution of diseases is dynamic, it is influenced by ecologic, genetic, and human factors. Travel has reduced the microbes' geographic barriers and heightened the spread of infectious diseases that can negatively affect humans, when interacting with microbes, produce pathogens in new locations (Borbora, 2018).

The world population grew from 2.5 to more than 6.9 billion between 1950 and 2013. The population growth favoured the urban or suburban areas, which brought more humans into close contact with larger groups of people, consequently the development of transportation had also led to a rapid growth in the movement of people, goods and the microbial organisms (Baker, 2015).

2. LITERATURE REVIEW

There is no widely accepted definition for the term risk since it is a multi-layer concept and can take countless forms. It is influenced by facts, perceptions, experiences, social groups and cultures. The traumatic events can dramatically affect risk perception and increase the awareness of terrorism in the tourism academic and non-academic literature such as the impact of September 11th terrorist attack.

Tourism is a job creator and is an indispensable element of the global economy since it provides travellers with international exposure to new cultures, ideas, and

communities. Despite this fact, travellers may change their choice of destination with the increased perception of risks. The tourism literature identifies five critical tourism risk factors significantly impacting the choice of destination as follows: (1) War and political instability (2) Health concerns (3) Crime (4) Terrorism and (5) Natural disaster. The impact of risk and crises can have long term devastating effects on tourist destinations and economy.

One study on risk perceptions and its relationship with travel intentions exhibited an inverse relationship in that when perceptions of risk are high, intentions to travel are lower. Numerous studies have examined mediating variables between risk perceptions and intentions to travel. These variables include past travel experience (Lepp & Gibson, 2008); nationality/culture (Angell and Cetron 2005; Azhar, El-Kafrawy et al. 2014; Baker 2015; Benelli and Mehlhorn 2016). The study revealed that travel safety was positively associated with intentions to travel and that travel safety was negatively associated with travel anxiety. Travel anxiety was impacted mostly by personality, but motivation also played a role in people's level of anxiety (Korstanje 2009). Scholars have found that risk perceptions significantly influence the intention to travel. Perceptions of risk are crucial to the travel-related decision-making process (Sönmez and Graefe 1998). It has also been noted that risk perceptions associated with international travel may also vary depending on the geographic region. In fact, risk perceptions seem to influence the choice of a destination for example when potential travellers perceive a destination as risky, their intentions to travel to that destination change and they will seek other destinations and riskier destinations may be omitted from the destination choice set (Crompton and McKay 1997; Sönmez and Graefe 1998). When travelling internationally, tourists often experience a great degree of anxiety (Aylor, Valdar et al. 2011). Risk perceptions, whether real or perceived, can potentially become the dominant factors in travel related decisions, particularly in the international context (Reisinger and Mavondo 2006). The influence of risk perceptions related to international travel has been found to be related to a number of factors: (1) type of risk, (2) culture/nationality, (3) proximity to origin, and (4) international media coverage.

Frequent travellers accelerate international spread of diseases if they are infected early and the outbreak does not otherwise expand rapidly (Chase, Cowan et al. 2007). The travel routes, aviation network, number of flights departing from and arriving at airport, number of passengers carried, and size of aircraft are important considerations in estimating the spread of modern epidemics (Hufnagel, Brockmann et al. 2004). For some types of infections, simulations illustrate that travel restrictions, particularly isolation of largest cities, will be a necessary component in epidemic control strategies (Chen and Wilson 2008). The present pattern of air travel could expedite the spread of

an influenza pandemic compared with past pandemics. In 1968 to 1969, 160 million persons travelled internationally on commercial flights (Grais, Ellis et al. 2003), this number increased to 2.9 billion in 2012 (Weber 2012). The Hong Kong influenza strain of 1968 to 1969 spread globally through the network of cities by air travel: first to northern latitudes, then southern latitudes. Modelling of the epidemic with air transportation data in 2000 for 52 cities showed that influenza would spread concurrently to cities in both hemispheres, resulting in minimal seasonal swing and little time for public health intervention, (Grais, Ellis et al. 2003). Disease would reach nearby cities first, but also distant cities with high air travel volumes; a pandemic initiating in Hong Kong can now spread speedily to northern hemisphere cities 111 days earlier than in 1968 (Grais, Ellis et al. 2003). Understanding the local ecology and linkages through travel can provide projection of disease spread.

Travellers can carry microbes and their genetic material, they can be victims, guards, couriers, processors, and transmitters of microbial pathogens (Chen and Wilson 2008). Therefore, they affect the host community through their contact with people and microbes. Hence, travel should be looked at as a cycle rather than just an origin and destination, (Chen and Wilson 2008). Travel also is linked to transmission of pathogens through blood and body fluid since travellers may get involved in sexual activities, pursue extreme sports, hike in the mountains and get engaged in other injury-prone activities that they would not risk at home.

A study survey on possible exposures to hepatitis B among more than 9000 European travellers revealed that most travellers had potential risk rate between (60.8%–75.8%), and high risk rate between (6.6%– 11.2%) (Zuckerman & Steffen, 2000). Another Canadian study revealed that 15% of travellers had potential exposure to blood and body fluids through: 9% new sex partner, 5% sharing instruments such as razor or toothbrush; 3.2% receiving injection for medical treatment e.g. having acupuncture or other percutaneous non-traditional treatment, 1% tattooing or body piercing and 0.5% abrasive injuries. Sexually transmitted infections (including hepatitis B, HIV, and HTLV-1) are acquired during travel can further spread during the journey and after travellers return home.

2.1 Specific Infectious Diseases Involving Potential Health Risks for Travellers

2.1.1 Severe Acute Respiratory Syndrome (SARS)

The outbreak of SARS in 2003 exemplifies the impact of spatial mobility and the dynamic role of travellers. In 2002, a previously unrecognized coronavirus caused an outbreak of respiratory infections in the Guangdong Province of China. The virus was originally transmitted from civet cats to humans, although subsequent research suggests that the reservoir host is the fruit bat (Chen and Wilson 2008). The outbreak became

visible to the world community when an infected physician from Guangdong who stayed for a day at MetropolisHotel in Hong Konginfectedother guests staying in the hotel which resulted in them carrying the virus back home. According to the World Health Organization 2004 report, more than 8000 SARS infections were reportedin May 2002. By July 2002, 29 countries and territories across five continents reported outbreaks with 774 fatalities to SARS, out of which 0% to 18.3% of the transmission rate were by aircraft and as far as seven rows from the source passenger (Chen and Wilson, 2008).

In one SAR case incident that significantly showed the potential for rapid contagious pathogen spread from person to person a businessman flew from Hong Kong to Frankfurt, Germany, on March 30, 2003, he travelled on seven flights throughout Europe during a 5-day period, including stops in Barcelona, London, Munich, and Hong Kong. He was hospitalized in Hong Kong on April 8 for SARS (Ali and Keil 2006). Responding to SARS outbreak, the Centre for Disease Control (CDC) issued advisories against travel to SARS infected countries which negatively affected tourism. Most countries in Asia instituted strict quarantine measures and restricted travel to reduce inter-country and cross-border spread of virus. SARS and the associated travel advisories led to significant decline in international tourist arrivals in 2003; the World Tourism Organization (WTO) reported that arrivals to some affected countries in Asia has fallen to less than 50%, (WTO, 2004). Although the region rebounded quickly, SARS had substantial economic impacts and was responsible for a 9% overall loss in travel volume for Asia in 2003 (Baker, 2015).

2.1.2 Chikungunya

Chikungunya is an infection first identified in 1952 in Tanzania, it is caused by the chikungunya virus (CHIKV). Symptoms include fever and joint pain and occur typically two to twelve days after exposure.The virus is spread between people by mosquitos. While the disease typically occurs in Africa and Asia, the virus was carried by travellers to Europe, the United States, Australia, India, Indonesia and Hong Kong since 2000s where outbreaks have been reported. In 2014 more than a million suspected cases occurred (Wikipedia, 2015).

2.1.3 Dengue fever

Dengue fever is a mosquito-borne tropical disease, the mosquito (Culicidae) family, also known as (Asian) tiger mosquito which is endemic in Southeast Asia, South Asia, the Pacific, Caribbean, and Central and South America. The history illustrates the intricate interactions of travel, movement of goods,

and translocation of infectious disease, (Baker 2015). Symptoms include a high fever, headache, vomiting, muscle and joint pains, and a characteristic skin rash. Recovery generally takes two to seven days. In a small proportion of cases, the disease develops into the life-threatening dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs. (Wikipedia) The infection hit the United States in 1980 as a result of ship loaded of used tires carried the Asian tiger mosquito causing the virus to spread. In 2001 Hawaii experienced dengue outbreaks; the likely source was travellers returning from French Polynesia. Dengue had been present in Hawaii until the 1940s (after World War II), when autochthonous transmission ceased. In spite of this, *Aedes albopictus* became established in Hawaii, and in 2001 was the primary vector in a local outbreak involving more than 100 cases (McLean, 2011).

2.1.4 Influenza

Seasonal and Epidemic Influenza remains an on-going global challenge because of the virus ability to recombine, re-assorts, and transform. It is transmitted by air and through direct contact with the virus. Airplanes provide an ideal infectious environment for the virus for example: a significant outbreak of the virus was on a malfunctioning ventilation system of an airplane for 3 hours that affected 72% of passengers on board (54 persons). Influenza initially spread by the movement of troops during World War I between 1918-1919. It continues to disseminate as pandemic strain of influenza through travel. Different outbreaks were recorded on multiple cruiseships; another significant outbreak was recorded during the summer of 1998 in Alaska and the Yukon Territory-Canada. Two outbreaks were recorded on two cruise ships affecting the passengers between New York, Montreal, Tahiti and Hawaii, (CDC, 97-98). Such outbreaks can affect thousands of travellers who can carry infection from one destination to the next. In a study on Swiss travellers, travellers were tested before and after travel for the Influenza virus where the study revealed that 2.8% of travellers had the influenza virus and 1.2% had more than a fourfold increase in antibody titres. Researchers estimated the influenza-associated occurrences 1.0 per 100 person/month abroad. Such results prove the effectiveness of the Influenza vaccinations as a preventable measure in Swiss travellers to the tropical destinations and the probability risk for the virus to spread through travel.

According to the influenza and pneumonia mortality data analysis of the Center of Disease Control and Prevention (CDC), the international air travel plays a major role in the introduction of the virus. In one study on the hemagglutinin influenza A (H3N2)

viruses on 13,000 human between 2002 and 2007 indicated that most new strains emerge in East and Southeast Asia. The new strains circulate continuously in this region and cause epidemics, leading to epidemics in moderate regions. The new strains initially spread to Oceania, North America, and Europe, later reaching South America. It is widely accepted that the new influenza strains most likely reach other parts of the world through travellers (Anastasina 2015; Pizzorno 2015). The on-going movement of humans and animals increase the likelihood for novel infections since it brings people and animal closer since over half of all human infections and emerging pathogens are zoonotic caused by animal in origin. Human access to untouched areas has introduced many infectious disease reservoirs which impact the density, distribution of population and wildlife, and the diseases dynamic for example: Bush-meat hunting, preparation, and consumption have been linked to several pandemics and epidemics, most notably human immunodeficiency virus (HIV), Ebola, and severe acute respiratory syndrome (SARS). According to Baker, 2015, travellers have contributed to the widespread of such diseases internationally.

2.1.5 Ebola Virus

Ebola virus, an RNA filovirus, has wiped out several primate populations over the past 20 years. It is restricted to the rainforests of central and western Africa and Southeast Asia. Marburg, a related virus, appears to be restricted to dry, open areas of central and eastern Africa, and the distributions of Ebola and Marburg likely reflect natural host distribution (ibid.). Ebola virus in humans can be traced back to the handling or consumption of infected wildlife remains particularly apes. Also several fruit bat species are suspected to be a natural reservoir host for Ebola (subtype Zaire) and possibly other subtypes. Ebola outbreak has been recorded in 2014 in Guinea, Liberia, Nigeria, Sierra Leone and spread across west Africa. The epidemic was reported from the forested region of south-eastern Guinea where the Ministry of Health in Guinea reported 151 clinically Ebola cases, 95 of these patients died. Liberia has reported 21 cases clinically Ebola cases of which 10 died. In Mali, the Ministry of Health has reported six suspected cases as of 7 April 2014 of which 4 suspected cases have been sent to CDC and the Institute Pasteur in Dakar for testing.

According to the United Nations (UN) and World Health Organization (WHO), in 2013 the first reported case on the Ebola outbreak in Guéckédou was traced to a traveller who carried the virus across the border and infected 759 people out of which 467 people died making this the worst ever Ebola outbreak. As of July 5th 2015, 27,609 cases and 11,261 deaths were reported worldwide in which Guinea, Sierra Leone and Liberia ranked the top. Guinea had 2499 deaths, Sierra Leone had 3940 deaths and Liberia had

4807 deaths.

Certain precautions should be carried out by tourists, visitors and residents of the affected area to minimize the risk of infection e.g. avoiding contact with symptomatic patients and/or their bodily fluids or with corpses and/or bodily fluids from deceased patients, avoiding close contacts with alive or dead wild animals and consumption of 'bush-meat', washing and peeling fruits and vegetables before consumption, and following hand-washing routines. Those who are providing medical care in the outbreak area are advised to wear protective clothing, including masks, gloves, gowns, and eye protection and practice proper infection prevention and control measures. The risk related to seeking medical care in affected countries depends on the implementation of precautionary measures in those settings.

In general, Africa's tourism is affected by Ebola, fear of the virus is enormous that it is impossible to convince travellers that some counties in Africa are virus free since many perceive it as a single country. For example: the outbreak of the Ebola virus in West Africa is affecting the economy and the sources of income especially the income generated from Tourism as travellers now are reconsidering trips to places far away and unaffected by Ebola such as Kenya and South Africa. The World Bank Group conducted a study on the economic impact of Ebola in Africa which revealed that the Ebola epidemic will continue to cripple the economies of Guinea, Liberia, and Sierra Leone despite the significant infection reduction rate recorded. The study estimated a total loss of at least US\$1.6 billion for the three countries in 2015 as a result of the epidemic (Oldstone 2009; Baker 2015; Del Rio and Guarner 2015; Roossinck 2016).

2.1.6 Zika Virus

Zika virus is a flavivirus (family Flaviviridae) related to West Nile, dengue, and yellow fever viruses. Zika virus was isolated in 1947 from a rhesus monkey in the Zika forest near Entebbe, Uganda; and the first human Zika virus infections were reported in Africa and Asia Zika virus a mosquito-borne disease. No outbreaks were recorded only 14 infectious cases were documented. Until this outbreak, no transmission of Zika virus had been reported outside of Africa and Asia. In April and May 2007, physicians on Yap Island, Federated States of Micronesia, noted an outbreak of illness characterized by rash, conjunctivitis, subjective fever, arthralgia, and arthritis. Although three patients tested positive with a commercially available dengue IgM kit, the physicians had the impression that this illness was clinically distinct from dengue, which had been detected on Yap in two previous outbreaks. In June 2007, serum from acutely ill patients was sent to the Centres for Disease Control and Prevention (CDC) Arbovirus Diagnostic and Reference Laboratory in Fort Collins, Colorado. Ten of 71 samples (14%) were found to

contain Zika virus RNA according to reverse-transcriptase–polymerase-chain-reaction (RT-PCR) assay. RT-PCR assays with the use of consensus primers for nucleic acid of other arboviruses, including dengue, chikungunya, o'nyong-nyong, Ross River, Barmah Forest, and Sindbis viruses, were all negative. (Dick, Kitchen et al. 1952; Oehler, Watrin et al. 2014; Musso, Roche et al. 2015). Since the 1950s, it has been known to occur within a narrow equatorial belt from Africa to Asia. From 2007 to 2016, the virus spread eastward, across the Pacific Ocean to the Americas, leading to the 2015–16 Zika virus epidemic. As of 2016, the illness cannot be prevented by medications or vaccines (Wikipedia, 2015).

2.2 Transmission

The World Health Organization announced on February, 13th2013 that the risk of person-to-person transmission appears to be very low. The MERS-CoV cells infect the lungs account only for 20% of respiratory epithelial cells, a large number of virions should be inhaled to cause infection. Dr. Anthony S. Fauci of the National Institutes of Health in Bethesda, Maryland, confirmed that MERS-CoV does not spread from a person to person way at all, he expressed his fear that the virus might mutate into a strain that does transmit from person to person. This has led to highlight concerns by healthcare workers (HCW) on human to human transmission. The Centres for Disease Control and Prevention (CDC) enlist MERS as transmissible from human-to-human. From their FAQ they explained that "MERS-CoV has been shown to spread between people who are in close contact". Transmission from infected patients to healthcare personnel has also been observed. Clusters of cases in several countries are being investigated. There is also a *New York Times* article which provides some correlative context for this. However, in May, the CDC revealed that the Illinois man who was originally thought to have been the first incidence of person to person spread (from the Indiana man at a business meeting), had in fact tested negative for MERS-CoV. After completing additional and more definitive tests using a neutralising antibody assay, experts at the CDC have concluded that the Indiana patient did not spread the virus to the Illinois patient. Tests concluded that the Illinois man had not been previously infected. It is possible for silent MERS to occur, this is when the patient does not develop symptoms. Early research has shown that up to 20% of cases show no signs of active infection but have MERS-CoV antibodies in their blood (Baker 2015).

3. CONCLUSION

Limited studies are addressing air travel impact on the spread of infectious diseases. More than 1 billion people travel by air each year. Air travel in fact can influence the

global spread of emerging and infectious diseases in many ways such as the close contact and large droplets airborne spread through small-particle aerosols, as in the case of severe acute respiratory syndrome (SARS); or even through contaminated food. Aircraft can transport infected disease vectors, such as rats or malaria infected mosquitoes, as non-paying passengers. Perhaps the greatest concern for global health, however, is the ability of a person with a contagious illness to travel to virtually any part of the world within 24 hours as has been seen with the Ebola virus. The importance of air travel for the spread of seasonal influenza was recently demonstrated by empirical data showing that the spread of influenza was delayed by the decrease in air travel after 11th September 2001 terrorist attack. With the current heightened awareness of Ebola, strategies should be set to minimize and inhibit more casualties and to control infections in developing countries; and prepare and guide travellers to those areas. Travellers should be considered an integral part of the global surveillance network for emerging infections. Research studies conducted can be used to alert the global community to the presence and susceptibility patterns of pathogens in different regions. A lesson for the world to remember from Ebola outbreak is to promptly respond to epidemics. The containment and preparedness efforts dramatically limited the potential impact of Ebola on the African economy, compared to earlier worst-case scenarios. This demonstrates why all countries both developing and developed should give pandemic preparedness a top priority. It points to the need for a global pandemic emergency financing facility that will enable the world to respond much more quickly and effectively to any future deadly outbreaks, and avoid the tragic and unnecessary human and economic costs that have resulted from the Ebola epidemic.

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