

CO-INFECTION OF DENGUE, MALARIA AND COVID-19: POSING THREATS TO THE HEALTH CARE SYSTEM

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ABSTRACT

Living amidst one of the most historic pandemics of the world that has created severe health, social and economic crisis, and everyone's attention has been focused on the novel Coronavirus. The panic and fear triggered by COVID 19 has consumed so much of our head space that we have sort of forgotten that there are diseases that exist besides COVID 19. In fact, these diseases have become more threatening when compounded with the very lethal and infectious COVID 19. To assess the impact of COVID 19 on other epidemics like dengue fever and malaria, this study has been carried out. The study further understands COVID 19 and its increased incidence with relation to Peltzman effect. Reports and journals have been referred to understand the association of these three diseases in depth. This study has demonstrated that majority of malaria and dengue cases are caused from the disease carrying vectors. When compounded with COVID 19, due to similar symptoms and lack of advanced detection facilities that can distinguish between the three diseases, patients are more vulnerable to getting fatally ill. This paper has provided some preventive measures and solutions to grapple with these diseases and has shown that the crisis generated by this will be more amplified if there is no timely response.

Keywords: Dengue, Coronavirus, Malaria, Peltzman effect, Pandemic

INTRODUCTION

Reports of WHO estimates that the incidence of dengue has dramatically increased in the recent years with as much as 390 million dengue virus infections per year. With the actual number of dengue cases still unreported and misclassified, the infection has worsened with the sudden

outbreak of COVID-19. The cause of Corona virus has either been blamed on the Chinese dietary habit or Wuhan's laboratory. Unfortunately, this isn't the first time that we have witnessed a pandemic of such a devastating scale. The Black Death that struck Europe and Asia

in the mid-1300s remains one of the deadliest pandemics in history. It was caused by the bacteria *Yersinia pestis* that attacked the lymphatic system, causing swelling in the lymphatic nodes. It is estimated that around 25 million people were killed from this Bubonic plague all around the world. COVID-19 was immediately preceded by another similar virus that was thought to have been transmitted from bats to other animals (civet cats) till it infected humans. Known as the SARS Coronavirus (SARS-Cov) identified in 2003, it spread from person to person. SARS-Cov shared similar symptoms with COVID-19 such as cough (initially dry), shortness of breath, and diarrhoea in the initial weeks until it rapidly led to respiratory failure. All these pandemics have a similar course of transference: they are contagious, generally spreading from animals to humans.

Dengue is a Vector borne viral infection found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas, the vectors responsible for the vertical transmission of this viral infection is through mosquito bite. WHO states that there are four types of DENV serotypes implying that it is possible for a person to be infected four times by DENV.⁽¹⁾ Many variants of DENV infections produce only

mild illness, where some DENV like Dengue Hemorrhagic Fever or Dengue Shock Syndrome (DHF/ DSS) can cause an acute illness. This can threaten lives when it gets complicated and becomes severe dengue. Severe dengue is the leading cause of illness and deaths in some Asian and Latin-American countries. It is reported that around two-fifths of the world's population living in the tropical or sub-tropical countries are at the risk of dengue infection which means that around 2.5 billion people in this world are at the risk of dengue infection. On an average 50 million people are infected world wide, with 0.5 million among them are in need of being admitted to hospital for dengue haemorrhagic cases.⁽²⁾

The Dengue virus is transmitted from the female mosquitoes, mainly of the species *Aedes aegypti*. Prior to 1970, about nine countries had experienced severe dengue epidemics but now the disease is endemic to over 100 countries across the world. America, South-east Asia and western Pacific regions remain vulnerable to the Dengue virus but Asia is the highest infected among all with 70% incidence of Dengue in the world. Classic dengue fever is observed to be more common in adults than in children. Teixeira and Barreto has argued that dengue is predominantly a childhood disease in South-East Asia but

an adult disease in most North and South American countries.⁽³⁾

Malaria on the other hand has been called the disease of the most vulnerable sections of the society i.e the very young and the economically weaker section. As per estimation, there are 219 million cases of the disease every year and more than 400,000 deaths. 61% of all malaria deaths are of children under 5 years of age alone while Sub-Saharan malaria death account for 90% in the world.⁽⁴⁾ It is caused by the plasmodium parasite that spreads from the bites of infected mosquitoes to humans. There are many variants of plasmodium parasites of which predominantly five of them cause malaria in humans. Those parasites are *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, *Plasmodium malaria* and *Plasmodium Knowles*. The plasmodium spreads from female Anopheles mosquito to humans host through the bite of the vector, or in other instances, malaria can spread when a mosquito bites an infected person and then spreads the parasite to uninfected people. Once bitten, the parasite enters the bloodstream and reaches the liver. An infection develops in the liver before re-entering the bloodstream and invading the RBCs in human body.

Diseases like dengue and malaria have already challenged global health organizations to provide better health services to the people around the world. The Covid-19 is adding more pressure on healthcare and management systems worldwide. Coronavirus disease (COVID 19) is an infectious disease cause by novel Coronavirus. The Covid-19 virus spreads primarily through droplets of saliva emanating from an infected person when they cough, sneeze or talk without a mask. It is a respiratory illness that mostly attacks the lungs creating difficulty in breathing and shortness of breath. As of 6th July, 2021, globally there have been 183,934,913 confirmed cases of COVID-19, including 3,985,022 deaths reported to WHO.

Co-infection of dengue, malaria and COVID-19 pose high threats to the health system. Monsoon is said to increase the risk of transmission of tropical, vector-borne diseases like malaria and dengue. When compounded with the pandemic that is ongoing, the risk factors have undoubtedly aggravated. Many symptoms of dengue, malaria and COVID-19 overlap which can make treatment of either of the disease very complicated and difficult. It is very difficult to differentiate between the three since all the three share similar laboratory and clinical characteristics.⁽⁵⁾

The common symptoms of the three include headache and weakness. In some cases, dengue may be symptomless in children or may be present only as an acute fever which is why it is often confused with other viral or bacterial illnesses. Backache, bone pain, gastrointestinal symptoms such as anorexia, nausea, vomiting, epigastric discomfort or pain are common to both Dengue and Coronavirus, in the same way the prognoses of malaria like fever and headache, except for chills, are similar to symptoms of Corona and appear 10-15 days after the infection spreads in the body. The first malarial symptoms are mild and may be difficult to detect as malaria.

Fusion of dengue, malaria and COVID-19 is a matter of grave concern because precise and right diagnosis of these viral diseases is difficult in the clinical laboratories resulting in misdiagnosis and false positive reports.

CHALLENGES OF CO-INFECTION

The world is still reeling under COVID-19 outbreak infection causing great deal of losses and is hence very much incapacitated to simultaneously deal with the ever increasing dengue infection rates and surging co-infection cases. Concerns are raised over pressure on the already limited resources. Moreover, a person with

both dengue and COVID-19 may suffer from severe illness that can result in death.⁽⁶⁾ In fact in a study published in the Journal 'Clinical Infectious Diseases' suggests that people who have had dengue in the past are susceptible to develop symptoms of COVID-19 if infected by novel Coronavirus.⁽⁷⁾

Besides the lethal threat of death and complications in an infected person, the co-infection of dengue, malaria and Coronavirus imposes a burden on the health workers. A health worker looking after Coronavirus patients cannot look after a dengue patient as well. On top of that, testing methods of dengue and COVID-19 are dependent on two very different testing kits. This further increases the expenditure of health management. This can put a strain not only in terms of limited number of health workers but also in financial aspects.

UNDERSTANDING PELTZMAN EFFECT IN TERMS OF COVID-19

Embroided in a mayhem caused by the novel Coronavirus, an absolute solution for dengue, COVID-19 or the co-infection seems far-fetched. If we were to understand the novel Coronavirus with regard to the Peltzman effect, it suggests that since more and more people are getting vaccinated for COVID-19 people

have developed a lax attitude towards the life threatening virus infection and have stopped or ignore following the laid down general guidelines and protocols such a social distancing, using hand sanitizers, wearing a mask etcetera. Doctors from NYU's Langone Health indicate that consciously or not, even those people who have not being inoculated are foregoing their protocols and initial precautions against the virus if others are getting vaccinated.

This behavioural phenomenon was first studied by **Sam Peltzman**, a professor of Economics at the University of Chicago's Booth school of Business. His study was done in the subject of automobile accidents. In his observation he found that highway safety regulations did not reduce highway hazards but instead increased highway deaths because of something called risk compensation. In other words, due to increased safety nets, automobile drivers were more careless and were willing to take bigger risks. Safety devices like seat belts and airbags instilled a false sense of assurance among the automobile drivers that their lack of attentiveness could be compensated by the vehicular features installed for their protection. ⁽⁸⁾

We can notice a similar pattern with regards to Coronavirus. Initially, when the

lockdown was imposed in India on 21st March, 2020, people were more apprehensive towards the virus impending threat to life. There was so much fear and confusion everywhere that people were thus forced to take the threat of the illness seriously but a year later, as the pandemic fatigue has set in, people have gone back to their normal lifestyle that prevailed before the pandemic. In fact, many have stopped wearing masks, observing social distancing or even washing their hands frequently. Hence, though safety measures can certainly help to lower risks, according to Peltzman effect, people tend to increase their risky behaviours owing to the safety nets since people's perception of risk decreases and so people can now afford to make riskier decisions. The scientists therefore are of the opinion that we must acknowledge and understand the Peltzman effect critically to counteract negative effects of COVID-19.

ISSUES IN DENGUE CONTROL DUE TO SOCIAL DISTANCING

Amidst the pandemic with the protocols in place, it has been observed that dengue control has been affected since spraying of insecticides cannot be carried out within the domestic places or in the compounds which are the prime breeding place for mosquitoes. The lockdown imposed in

countries has also interrupted the management of public spaces and recreational areas. Ensuring cleanliness of streets and reduction in collection of stagnant water has been halted. All these have given an edge to the dengue fever vectors. Moreover, the lockdown has restricted people to stay at home which according to scientists have increased the risk of dengue infection because the dengue fever vectors lay their eggs mostly on the walls of water-filled containers in and around domestic surroundings. From a study in Thailand, it was found out that with the implementation of social distancing, the sudden influx in dengue cases per month on average in each area is expected to be 26.1%. In addition, even if people are suffering from dengue, due to the risks of Coronavirus infection from the health professionals, infected patients are afraid and reluctant to go to the hospital.⁽⁹⁾

WAY FORWARD

The development of Vaccination for Coronavirus has been a sigh of relief for people all around the world, however, it must be noted that the vaccination does not offer an absolute or an immediate solution. For increased effectiveness of the vaccination, the complete recommended doses must be taken within the recommended time period. But protective

and preventive measures must go hand in hand with immunization. The need of the hour is affordable and reliable antigen test that can give accurate results. The test must be able to distinguish between COVID 19, malaria and dengue fever. Sufficient infrastructure must be further developed to treat patients with infections. Hospital beds must be increased and more health workers must be recruited that can look after either of the disease. Diagnosis must be available for all infections. Since there are chances of cases of dengue peaking in the monsoon season, strong measures like effective spraying of larvicide must be ensured. Also, vector control strategies must be adopted. More and more people need to be taught the basic precautionary measures against both dengue and COVID 19 and everyone must be encouraged to follow appropriate lifestyle and behaviour that decreases their risks to these viruses.⁽¹⁰⁾ The WHO recommends that communities living in dengue and malaria endemic regions should be educated to recognize symptoms and prevent further transmission of the virus. In cases of malaria and dengue, recurrence is quite often possible with different serotypes leading to a secondary infection, therefore primary prevention measures should be continued even after recovery from initial infection.

As the proverb goes, ‘prevention is better than cure’, people can be protected against these epidemic and pandemic diseases mainly through taking preventive measures. It goes without saying that adequate health management and resource distribution is mandatory for ensuring preparedness in times of crisis.

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