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Research Paper

Globalization and its effect on the emergence of infectious diseases

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ABSTRACT

The study explores the link between globalization and epidemiology, that is, emergence, distribution, transmission and management of infectious diseases over the world. There exists a direct or indirect I nfluence on infectious diseases of the various forces of globalization like economic, technological, political, demographic, environmental and cultural. A report by a panel led by the secretary general of the UN on Global Security, infectious diseases was included in the list of emerging threats that need to be dealt with seriously. As indicated by the report, such dangers perceive no national boundaries and should be tended to at the global, local, and national levels in light of the fact that no state, regardless of how strong can, all alone, make itself immune to them.

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INTRODUCTION

In the pre-modern era, colonization, subjugation and war prompted the worldwide spread of irresistible infections, with wrecking results. Human infections, for example, tuberculosis, polio, smallpox and diphtheria circled generally and before the coming of vaccines, these illnesses caused significant dreariness and mortality. Simultaneously, animal illnesses, for example, rinderpest spread along shipping lanes and with travelling armed forces, with destroying impacts on domesticated animals and ward human populations. Be that as it may, in the past two decades, clinical advances, admittance to medical services and further developed sanitation have diminished the general mortality and grimness connected to irresistible illnesses. The quick improvement of SARS-CoV-2 vaccine addresses the adequacy of current science in quickly countering dangers from arising microorganisms. Moreover, deaths from emerging and re-emerging infections, in comparison with seasonal and endemic infections, have persisted throughout the twenty-first century. This focuses on a potential new time of infectious diseases, characterized by outbreaks of emerging, re-emerging and endemic pathogens that spread rapidly supported by global networks and shifted ranges owing to climate change. According to WHO, globalization is the increased interconnectedness and interdependence of people and countries. It is generally understood to include two interrelated elements: the opening of international borders to increasingly fast flows of goods, services, finance, people and ideas; and the changes in institutions and policies at national and international levels that facilitate or promote such flows. The Global Burden Of Disease Study (GBDS) notes that the year 2000 marked that 22% deaths worldwide were due to infectious diseases and the 20% poorest had a very high burden of diseases as compared to the 80%. The estimates of future patterns of burden of diseases are uncertain given the evolving disease patterns due to the unimagined impact of globalization on human societies.
Economic globalization came into being as a concept with the GATT giving way to WTO in 1995 which brought into being numerous multilateral trade agreements which facilitated international economicconnectivity, market changes, restructuring of sectors like pharmaceuticals and human progress via wealth. Multilateral trade agreements with uneven benefits to nations influence the availability of resources with governments for expenditure on health proven by the fact that during the 1990s Central and Eastern Europe saw a surge in

infections with inadequate attention paid to health due to rapid economic shifts. The financial crisis of 1990s effect on STDs, HIV-AIDS and the rise in cases of malaria due to structural adjustment in Africa because of reduced spending on disease control programmes, are a testimony to the fact that globalization can directly or indirectly affect the spread of infectious diseases. Increasing trade in food products brought about a change in dietary practices, wherein a yearning for fresh 'ethnic' foods has come up leading to spread of infections as there is a growing dependence on producers abroad; the stages of harvest, storage and transportation may very well be contaminated before the food is exported to other nations. Methods of mass food production may cause dissemination of contaminated food, such as communal housing of poultry which generated birds with a common risk profile; hamburgers from fast food chains in the US have been responsible for the outbreak of *E.coli* 0157:H7.
In the context of pharmaceuticals, there is an issue of drug resistance leading to Multidrug resistant tuberculosis and HIV because of unregulated consumption and access to pharmaceuticals in a global market. This could prove to be a menace if there are no sufficient regulatory mechanisms and standards alongside globalization of the pharmaceutical industry. Anthropogenic changes which are attached to globalization over the years have led to adverse effects on human lives due to an unprecedented change in the environment resulting in as rightly noted by Arno Karlen in his book, 'Man and Microbes', a 'new biocultural era'. The IPCC report has suggested that climate change will lead to a variation in the geographical distribution and transmission of vector-borne diseases like malaria and dengue; the statement has been backed by the fact of estimates given by the IPCC of global warming leading to an increase in the cases of diarrhoea and altering the prevalence and range of infections. An instance of environmental globalization leading to the emergence of infectious diseases is the increasing prevalence of Schistosomiasis due to an expansion of irrigation projects in warm arid regions. Oceanic warming leads to algae blooms affecting human health and marine life and proliferation of planktonic population that harbors human pathogens. Extreme weather events increase infections by either creating situations of disasters breaking down public health systems or by altering ecosystems which advances the spread of infectious diseases.

Economic growth and technological changes lead to an increase in demand for water-related services which, therefore, leads to social tensions and changes the production of goods and services in the society. There have been variations in prevalence of infectious diseases because of construction of dams as they lead to profound ecological changes which encourage vector breeding, especially malaria, as happened in the case of the Low Dam of Aswan on the Nile River. Reservoirs and rice farming have been reported to create conditions for multiplication of snail hosts of schistosomiasis and malaria in African countries. With the expansion and liberalization of trade, mining, hydropower, deforestation which creates situations for pathogens like guanarito virus to infect populations, have become an attractive financial prospect. In 1996, WHO reported that since 1975, over thirty new infectious diseases have emerged and most of them have emerged due to the changes in social and environmental conditions. Global migration has been intensified due to many reasons like economic instability caused by structural programmes, unequal benefits of trade with the poor as victims, loss of arable land, political tensions, brain drain or leisure have led to spread of infectious diseases. Conditions that force people to migrate like poverty, overcrowding or economic failure are also the same ones that lead to proliferation of infections as they are the reasons for the breakdown of public health infrastructure. Mass migration increases risk of infectious diseases if the migrants have a history of malnourishment or poor sanitation conditions favorable for the spread of infections, excessive use of antibiotics leading to drug resistance and poor housing leading to tuberculosis or respiratory diseases. Refugee camps have been a safe haven of disease vectors as happened in Zaire refugee camps where 50,000 people fleeing from Rwanda died of cholera and dysentery (CDCP 1995).

As in the case of HIV/AIDS, economic migration has been a major force in its evolution wherein the male cross-border migrants are at a higher risk of HIV infection, as with the change in living and working standards along with poor access to preventative measures, STDs also become a risk. Migration of people from non-endemic areas to endemic areas increases susceptibility of a certain population to infections, for instance the rural migrants of Afghan cities like Kabul at risk of urban cutaneous leishmaniasis; or vice-versa placing the migrant's destination's population at risk. Megacities with lucrative opportunities as a result of industrialization and economic development are another hotspots for risk of infection spread due to migration. Globalization has resulted in an uneven growth of the nature of urbanization in the developing countries. Due to the limited reach of the public health infrastructure, some neglected areas in the periphery often bear the brunt of spread of infection. Over 50% population in rapidly urbanizing areas exist at the level of 'extreme deprivation' with no access to safe drinking water, 30-50% solid waste uncollected (WHO/ UNICEF 2000) and emerging issues like air pollution that increases susceptibility of citizens to respiratory diseases (Delhi's extreme pollution levels - World Resources Institute 1999]. The population explosion in urbanized cities witnessed 'crowd infections' like respiratory and skin infections. Vector-borne diseases

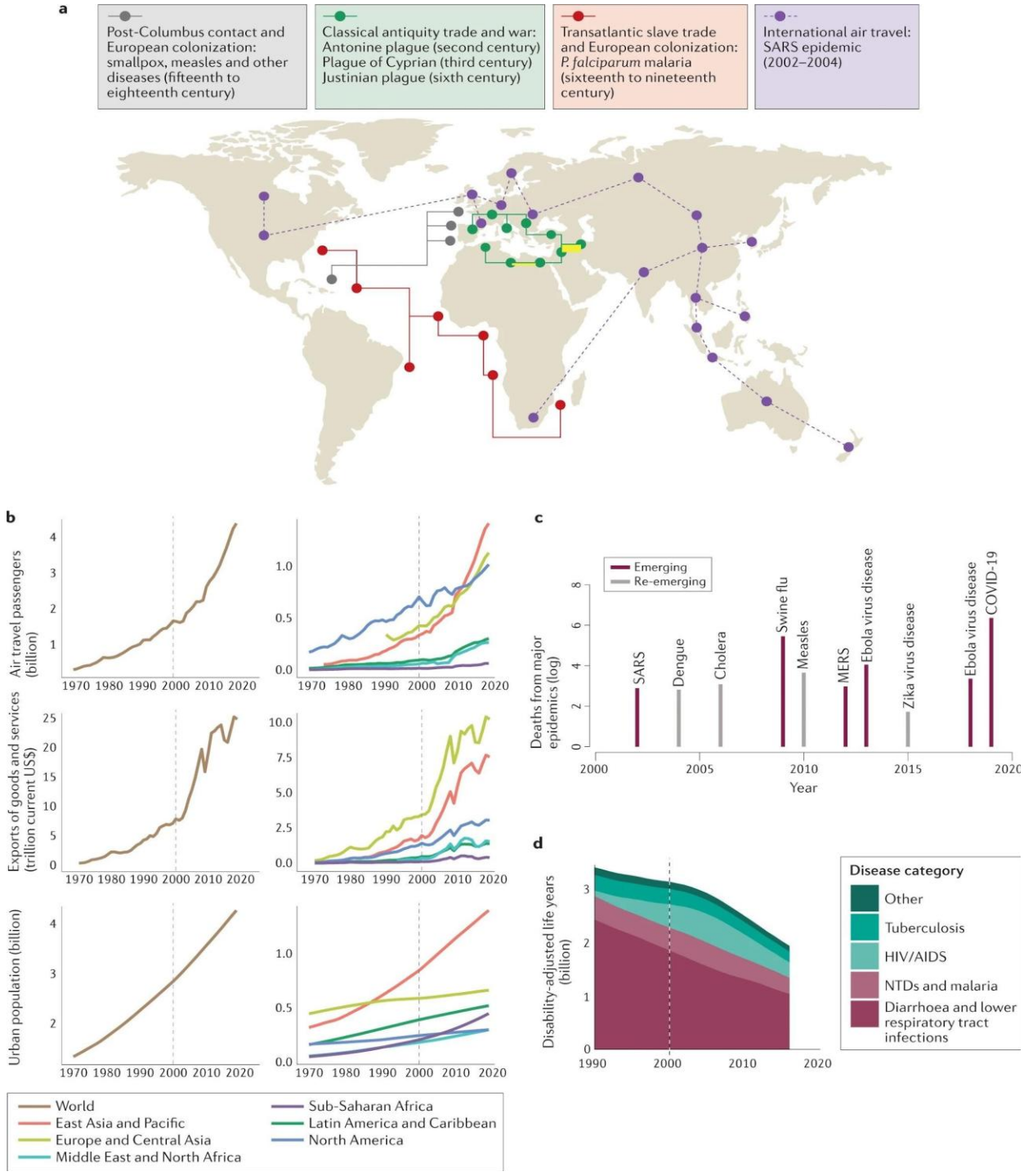

Figure 1: Human connectivity and infectious disease outbreaks in premodern and modern times. Nature.com. Sources-World Bank, World Health Organization and Our World in Data.

Information and Communication Technology (ICT) has positively contributed to the reduction of the spread and impact of infectious diseases as seen in the example of the recent pandemic Covid-19. With satellite and media technology, timely communication of diseases has eased many burdens, access to medical knowledge through the Internet, growth of telemedicine and geographical information system improving measures of controlling outbreaks are a few examples. But, ICT is largely limited in the developing world through affordability, access and

education as evident by the Warna project in India. Transportation technology has enhanced mobility of people significantly which has also accelerated 'International transfer of risks'. There has been a spurt in business travel, international tourism, globalizations of financial services and swift movement of cargo.

Travel and movement of cargo have been carriers of pathogens with a rapid geographical spread. Over 50% of malaria cases in the UK have been in the immigrants and epidemics of influenza, cholera or tuberculosis have been spread via commercial flights and outbreaks of Legionella pneumonia have been significantly problematic on cruise ships as per CDCP (Centre for Disease Control and Prevention). Some infections are limited to certain specific travels like the outbreak of Meningitis in the pilgrims of Hajj along with other infections of hepatitis and cholera being reported in the pilgrims way back home. People are also at risk of being directly exposed to materials containing pathogens exported or imported as happened in the case of the death of 7 Germans, by the pathogen named Marburg virus, who handled blood and tissues sent from African green monkeys in Uganda. Modern medical techniques are also wrought with vulnerabilities of inadequate training and mishandling of surgical equipment and negligence of sanitation and health standards as happened in the case of outbreak of Ebola in Congo in hospitals and Lassa fever in Nigeria. Antimicrobial resistance due to inappropriate use of antibiotics and trade in blood practices has also hastened infection spread. The Figure 1 proves that infectious diseases are on a rise due to climate, technological, and demographic developments. Globalization leads to profound changes in the biological, environmental and social conditions that are often responsible for spread of infectious diseases. There are both positive and negative changes that globalization brings about. On the one hand, if global warming leads to an increase in vector-borne diseases on the other hand, it decreases the occurrence of age-related pneumonia. Effects of economic globalization are varied as it leads to economic inequalities as if the rich benefits, the poor keep on getting poorer (UNDP).

Epidemiology and surveillance have provided us with methods to evaluate the trans-border patterns of infectious diseases which arise due to globalization. There is a gross underestimation of the burden of diseases faced by the poor developing world as compared to the rich industrialized world. There is a need for national and international cooperation on health to improve surveillance, prevention, control and treatment. As aptly summarized by Dr Martin Luther King Jr. "It really boils down to this: that all life is interrelated. We are all caught in an inescapable network of mutuality, tied into a single garment of destiny. Whatever affects one directly, affects all indirectly." There is a need for enhanced training and awareness of global dimensions of infectious diseases to understand their changing nature with globalization and future research needs to align with a global view of disease risk. Over the years, even though mortality from infections has reduced considerably and impacts of such diseases have been controlled by innovations in technology, access to the same remains a contentious issue. There is a need to successfully evaluate future risks associated with infectious diseases about how shifting patterns of demographic, climatic and technological factors may collectively affect the risk of pathogen emergence, alterations to dynamics and global spread. The COVID-19 pandemic, including the rapid global circulation of evolved strains, highlights the need for a collaborative, worldwide framework for infectious disease research and control.

Global construction according to the Nobel laureate Amartya Sen, is the needed response to global doubts. Past diseases and hazard factors, globalization is likewise influencing health items and services. This issue is especially applicable for the Mexico-United States border. A new report assessed that there are inexcess of 17 million health related crossings at this border each year. Seventy-five percent of these crossings are from the United States into Mexico, most frequently to buy drugs without prescription, including antibiotics. For sure, globalization is an inescapable reality. However, we can devise and carry out a course of global reconciliation that both limits ill impacts and safeguards the individuals who are vulnerable against them and, simultaneously, augments advantages and delivers a fair conveyance of these advantages. Fair access to top quality service has likewise become integral to the global development for human rights. Thus, health can add to refining globalization since it includes those domains that join all people. Health related processes, like birth, disease, pain, recuperation, and demise, characterize the reason for our common mankind. The integrated global economy with flow of technology, trade in goods and services, capital flows and population mobility, it is a common interest of the global society to invest in resources to strengthen the capacity to fight against the emerging infectious diseases.

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