Journal of Pharmaceutical Research International

33(60B): 962-968, 2021; Article no.JPRI.79544
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Variations of Influenza: A Review

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60B34700

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/79544

Review Article

Received 18 October 2021
Accepted 20 December 2021
Published 23 December 2021

ABSTRACT

The seasonal influenza or flu remains a major cause of illness and death all over the world. It is the transmissible viral disease that affects whole of the respiratory tract and its severity ranges from mild to severe. The activity of influenza virus shows great periodic rhythm in different areas of the globe where neither hot nor cold and it is very uncertain in equatorial region where temperature is high throughout the year indicating that climatic components can drives periodic rhythm. Seasonal variability in infectious disease conditions is one of the ancient studies in human bioscience, dating from at least archaic Greece. Each year around the globe despite decade of research and drug development, annual flu viruses constantly cause outbreaks of influenza. Albeit we are starting to recognize the mechanisms that support the emergence of annual flu microorganisms, the onset and character of the evolving recent viruses remains unexpected. The flu pandemic is an important cause of the sickness and death of the elderly. Decreased immune function plays an important role in the worst outcome. Several factors which impact on the severity of annual influenza includes characteristics of the specific virus, use of antiviral drugs, and vaccination of influenza. The population which has high chances of getting this serious illness are: gravid mother, kids below the 5 years of age, the older age group, people with persistent cases (such as long-standing heart disease, lung disease, kidney, digestive, neuropsychiatric, hepatic disease or blood related disorder) with people with low immune status (such as HIV / AIDS, taking chemotherapy or steroids. In cooler climates, occasional outbreaks take place predominantly in the cold climate, while in hot climates, colds can occur year-round, originates the unusual epidemic.

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Keywords: Seasonal influenza; pandemic; seasonal variability; antiviral drugs; vaccination; low immunity; epidemic.

1. INTRODUCTION

Influenza viruses have emerged as deadly viruses that cause heavy burdens worldwide. To better understand the pattern in which the flu occurs worldwide is a matter of an hour. The current study focuses on an investigation of the strength of the Influenza virus, particularly the impact of periodic changes on the expansion of the virus and the cause of outbreaks / pandemics [1]. Influenza throughout the year has caused a great deal of illness and death worldwide, especially among the elderly and children under the age of five [2]. The virus is extremely infectious and a person can get traits, which ranges from moderate to very harsh. In some people (very young, people with chronic comorbid conditions, immobilized people of all ages, pregnant women, and frail adults), the virus can lead to increased morbidity and mortality [3], around the globe every year despite decades of research and drug development, annual flu viruses constantly cause outbreaks of influenza. A basic mechanism that causes these recurring outbreaks is to override defences caused by previous infections or vaccinations [4]. Annual flu, or flu, is an airborne bacterium that occurs annually in autumn to early spring [3]. A bacterial respiratory disease can cause epidemics that are dangerous for the global security. Mexico was the first country to inform the WHO of an outbreak of the first 21st Century Influenza virus, caused by virus A (H1N1) 2009 [5]. The flu virus action shows great periodic rhythm in the cooler parts of the globe and a slightly understandable time in the tropics, indicating that climatic components can direct periodic system. From the current conclusion of US journal (PNAS), we have moved closer to understanding the flu season by highlighting the impact of environmental factors on flu transmission and survival [6]. Previous observations that the flu pandemic occurred in winter in cooler region, associated with inadequate information about the flu epidemic in the equatorial region, led to the view that cooler and drier situations were needed, and perhaps enough, for the flu carrier. Recent reports of high levels of occupational flu and well-defined seasons of the tropics, where hot and moist climate usually remains throughout the twelve-month, have provided inadequate preconceived notions to explain global flu patterns [7]. Increasing proximity between the susceptible and the infected host is often suggested to be an important driver of the flu season [7] understanding the potential of the flu is crucial to improve readiness and control, as annual flu flows represent a major public health burden [8].

2. OBJECTIVE

The main objective of this review is - ***1) To study the seasonal variation of influenza*.**

How influenza vary with the different seasons, changes in environmental conditions alter the seasonal flu. Influenza monitoring is an important tool for identifying emerging issues. In different part of globe it vary depending on change in season, the spread of the flu in tropical and subtropical areas discloses a complicated pattern with annual spreads in some areas and twice a year in others. variation in seasonal flu gives us idea for modifying the flu vaccine.

3. MAIN APPROACH

Influenza A and B two of these are the main constituents of Orthomyxoviridae group of viruses, which are the main source of the serious lung illness, two of these viruses appear to be capsulated which carry octave negative RNA components that include 9 proteins in the building and 2 non-structural proteins (influenza A virus) or 10 structural proteins 1 non -structural protein(influenza-B) virus [9]. The seasonality affects the strength of the flu in a variety of ways [10]. The diurnal cycle is thought to affect the immune system which increases the chances of getting affected by viruses during the cold climate [11]. Total humidity and high temperatures can increase viral survival and general availability, both viral transmission (IVT) and viral flu (IVS) survival are affected by relative humidity (RH), the inhibition tendency of relative humidity (RH) to the transferring ability of viruses and viral flu survival (IVS) is much less than total humidity (AH). In the presented data, 50% of IVT variables and 90% variations of viral transmission (IVS) were defined by total humidity (AH), and likewise, only 12% and only 36% defined by relative humidity (RH). In cooler climates, both outside and inside total humidity have a great periodic pattern that chills the cold season. This periodic rhythm coincides with the winter, causes rise in of IVS and IVT and this can describe the timing of the flu. Therefore, the variation in total

humidity (AH) gives a specific, comprehensible, and also logical description for the detected differences in IVS, IVT and seasonal flu in warmer climates [12]. A new influenza virus appears in every twelve month and leads to flu pandemic so it is known as seasonal flu and this annual flu is due to the variation of the novel form that shows the different capacity of antigen to induce immunity differences in previous strain because of the saturated mutation. In another term, immunoglobulins acquired in a previous infection are unable to provide protection in opposite to seasonal variability. In reality, the flu pandemic is very much deadly than the annual flu pandemic. Between 1918-1919 more than 40 thousand population was wiped out in “Spanish flu” which included in a few flu outbreaks, which happened in the past. The most current epidemic is the “2009 H1N1 flu” outbreaks [13]. In spite of the vital infection load of flu on population, our knowledge of the basis of its presented period persist inadequate. Previous investigation that the flu epidemic occurred in winter in cooler climates, combined with insufficient information about flu outbreaks in the equatorial region, led to the view that cooler and drier situations were needed, and perhaps adequate, for the flu carrier. Recent reports of high levels of occupational flu and well-defined seasons of the tropics, where hot and moist situations usually remain throughout the year, provide former speculative inadequate interpretations of worldwide flu patterns [7]. Influenza-induced flu outbreaks are well-known components that control the extremity and spread of the flu can comprise infection, environmental and mutations that are not inherited, bacterial interactions, environmental resistance, viral resistance and spread, and anthropogenic interventions. it is mainly caused by heat and humidity, with cooler conditions that will dry up IAV survival and increase in warmer climates at higher altitudes, while humid rainy conditions tend to erupt in low-lying areas, as seen in tropical and subtropical areas [14]. The flu season is very different in tropical countries [15]. The population which has high chances of getting this serious illness are: gravid mother, kids below the 5 years of age, the older age group, people with persistent cases (such as long-standing heart disease, lung disease, kidney, digestive, neuropsychiatric, hepatic disease or blood related disorder) with people with low immune status (such as HIV / AIDS, taking chemotherapy or steroids. Health professional are at greater threat of contracting the flu as a primary reason of the varying nature of seasonality for influenza in equatorial nations always remains indefinite, inside crowding, it is of increased chances of getting contact with the patients and the threat of their transmission, especially to high-risk populations [16]. While the underlying cause of flu season fluctuations in tropical countries remains undetectable, overcrowding, low temperatures, and low humidity in a given area can affect both transmission and handling [17]. Research have shown that transmission level of influenza got affected by the heat and moist. The current study focuses on the importance of climatic components, specifically hot and cold conditions and moisture, in the formation of an internal, natural, and adaptive response to infections in the respiratory tract [18]. The flu causes seasonal outbreaks each year and causes occasional flu outbreaks. The World Health Organization (WHO) Global Influenza Surveillance and Response System (GISRS) has contributed to the global understanding of flu patterns, but there has been limited regional analysis. The WHOs study describes virological patterns and flu control programs in eleven different nations countries which are located in the area of South-East Asia [19]. Globally, the flu virus causes approximately 39·1 thousand episodes of lung infections (95% ambiguity) and 58,200 demises (44,000-74,200) each year; and syncytial respiratory virus is approximated to cause 24 thousand incidents and 76,600 deaths annually [20]. various immunomodulatory agents and indicating pathway inhibitors are developed prior to administration. Ongoing flu challenges include the outbreak of H1N1 flu in 2009, human infections with the H7N9 bird flu in 2013, and rare human cases of the H5N1 bird flu [21]. In regards to spreading, the annual flu transmits simply, with fast transferring to densely populated places involving academic centres and convalescent homes. Whenever a person who is suffering from the infection sneeze or cough, the droplet particles that contain the germs (infectious droplets) scatters into the air and can diffuses up to hundred cm, contaminating the closest person who inhale these droplets. Hands contaminated with flu viruses can transmit the virus. To stops the spreading, one must cover their mouth and nose with a cloth or mask when coughing, and hands should be cleaned routinely.

4. DISCUSSION

In cooler weather, occasional pandemics happen especially during the cold, while in the tropics, the flu can appear across the year, causing unusual epidemic. The period from infection to

appearance of symptoms of disease, is called as incubation period, is about two days, but from one to four days [22]. The variation in season affects the strength of the flu in many ways [9].

Influenza monitoring is an important tool for diagnosing emerging / regenerative pressures, and defining seasonal flu control systems is important to understand the epidemic and the flu season and to improve flu control strategies. The flu is caused by an outbreak that occurs in different ways every year [25]. The relationship between the influenza antigenic drift and vaccination is at the crossroads of evolutionary biology and public health, and should be viewed and analysed in both cases at the same time [26]. Influenza A has 2.3-12.3% days and for influenza B has 0.6-5.5% days of the prevalence and incubation period respectively. H1N1, H2N2, H3N3, H5N1, and H7N9 are different five strains of influenza A virus that have been evaluated. Transmission associated indicators (number of regenerations, attack rate, serial interval, latent time, incubation period, infectious period) and extremity (hospitalisation rate, mortality rate) are different for sub-flu. In general, H1N1 and H2N2 showed a lesser attack rate than H3N2. In addition, other subtypes such as H1N1, H2N2, H3N2 showed lower mortality rates than H5N1and H7N9 [27]. The continued spread of the H5N1 bird flu virus has greatly increased interest in pandemic prediction [28]. While the direct effects stay uncertain, moisture, rain, and heat are the main contraindications as the drivers of climate flu distribution in tropical and subtropical climates. Several research proposed that the effect of moisture on flu distribution involves two methods (bimodal), on the other hand decreased by inconsistencies as proposed by Shaman in al [12]. outbreaks of flu in areas with high temperatures and increased altitude humidity throughout the year had a propensity to appear in course of monsoon season, when total humidity (AH) and heavy rain were in peak. This type of system has been noticed regularly in many nations [29]. Although seasonal flu viruses are worldwide, prevention and treatment occur at the district, city, and community levels. At these scales, the time, duration and severity of epidemics vary widely, but the causes of these variables are not well understood [30]. The 2017-2018 flu period reminisces us that it is necessary for health care workers to be planned for the yearly outbreak of this infectious lung disorders related with ability to form dangerous problems. Immunisation is the best way for avoidance and command colds, reduce illness, hospitalization and death. The elevated rate of flu-related illnesses and deaths is seen in old age people [31]. Annual immunization is one of the most effective and inexpensive ways to prevent and control the flu epidemic. Most current flu vaccines are strong inducers of antibody responses against protein surface viruses, hemagglutinin (HA) and neuraminidase (NA), but they are the poorest antibodies of antibodies to antagonized

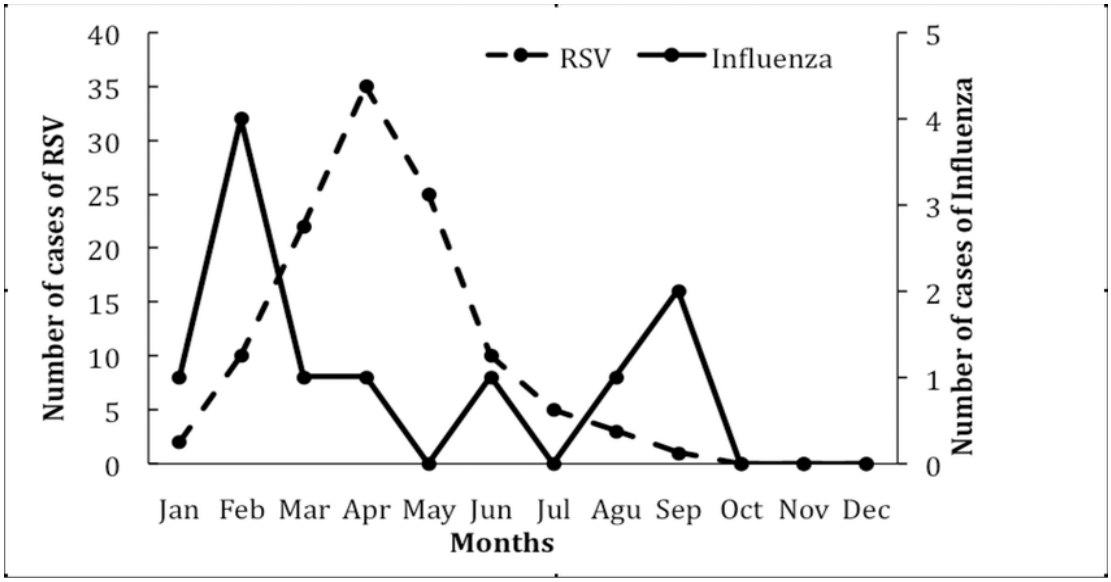

Fig. 1. RSV case frequency

stored proteins. In addition, due to the high variability of over-the-counter protein due to antigenic or antigenic deviations, most licensed vaccines currently do not provide little or no protection against erosion or alterations [32]. Adult immunity decreases with age, a condition called immune senescence. The immune system not only causes an increase in flu disease, but also causes the vaccine inefficient. To direct the demand for advanced vaccines that gives improved protection in this people who have greater chances of infection, 2nd formulation – in current year specifically for people of age 65 and older large-dose immunization and used vaccine - have been permitted [31]. Based on recent advancement in defining flu vaccines, it looks that the evolution of a general flu vaccine is possible [32-34].

5. CONCLUSION

The periodic pattern of lung infection and other breathing problems has been extensively notable from millions of year, as in every year in winter and warmer climate flu and flu epidemic strikes people. During the period of December in addition to this, viral infections such as acute respiratory syndrome coronavirus (SARS-Co V) and SARS-CoV-2 have. For several years, testing and discussion have been done on the mechanism that supports the annual respiratory tract infection. The most common viruses associated with lower respiratory tract infections in young children below the 5 years of age and the older people above 65 years of age are the influenza virus, respiratory syncytial virus, parainfluenza virus, and metapneumovirus. To update the public health policies and plans for their prevention and control a global record on the activity of viruses in every month is needed. Influenza is a serious respiratory disease in mammals and poultry from zoonotic ponds in birds and water. Although influenza viruses are among the most widely studied, existing control options require continuous improvement [35]. Flu vaccines should be renewed regularly due to continuous antigenic exchanges and abnormal antigenic changes to viral glycoproteins. Current records indicate that, the well- defined season where the considerable level of seasonal flu can occur is the tropics, where hot and moist situations usually remain throughout the year, provide former speculative inadequate interpretations of global flu patterns. The global death toll from the flu in 1957-1959 was comparable to that of the 1918 epidemic but almost ten times that of the 2009 epidemic. The impact of the epidemic on death was delayed in several countries, pointing to a window of opportunity for vaccination in the coming epidemic. Apart from the notable infectious load of influenza virus on human, our knowledge of the basis of its presented period remains deficient. The observation that the flu pandemic occurred in winter or in cooler weather, associated with inadequate information related to the flu epidemic in the equatorial region, led to the view that cooler and drier surroundings were needed, and may be adequate, with the flu carrier. Researchers have discovered that most nations, which are located in Central, and South America, South and Southeast Asia experience the first flu season from the period of April to June. The second highest rate between October to December is shown by India. Africa has presented a complex picture of the expanded work from October to December in the northern region, from April to June in the southern region and throughout the year in sub-Saharan Africa. Influenza C and D is not protected by the seasonal flu vaccines. Further, seasonal flu vaccines will NOT act opposite to the infections and illnesses that are produced by other microorganism or viruses that can also represents as flu-like symptoms. There are many other viruses besides the flu that can lead to flu-like illnesses (ILI) that spread during the flu season. key questions in the flu season lives undetermined. Subsequent study is much necessary in equatorial areas, where our knowledge of the seasons remains insufficient and will need a union of speculative and investigational analysis. A progressive knowledge of the climatic components driving the flu epidemic can also help predict how climate change will be affects the dynamics of flu at global climate change regions.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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DOI: 10.9734/jpri/2020/v32i730517

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/79544