Influenza to Follow COVID-19 Wave: the facts and flaws of influenza in Pakistan

Pneumonia is the leading cause of mortality for children less than 5 years old in Pakistan. Respiratory viruses such as *Influenza*, *Parainfluenza* and *Respiratory syncytial virus* (RSV) remain the most common etiology of infection amongst hospitalized patients with community acquired pneumonia.[1] CDC estimates for the pre-pandemic 2019-2020 influenza season disease burden was as high as 66.2 cases per 100,000 individuals with a test positivity rate of 16.8%. Global assessment of disease burden showed 19% test positivity rate from respiratory samples collected between November and December 2019.[2]

Since the year 2009 and the introduction of Influenza type A following the H1N1 pandemic, there has been a consistent rise in the number of annual cases of flu in Pakistan. Cases start appearing early in October with a peak incidence from December to February followed by a decline towards April. In the year 2016, the National Institute of Health Pakistan conducted testing of 300 samples from across the country out of which 110 were positive for influenza. Multiple studies post the H1N1 pandemic of 2009 showed a local test positivity rate of between 12-20%, with *influenza A* as the predominant strain in children.[3,4] As a result of lifestyle modifications during the COVID-19 pandemic such as social distancing, wearing of mask and effective handwashing, flu activity for the 2020-2021 season was the lowest since the CDC began reporting in 1997. This could potentially mean a decline in immunity for the upcoming flu season.

So which populations are at highest risk to be affected by seasonal influenza and would benefit most from the flu vaccine? According to the WHO, for countries who are currently expanding their influenza immunization program, pregnant females are at highest priority to receive the vaccine followed by children 6 months to 5 years of age, individuals with certain chronic medical conditions and older adults greater than 65 years of age. A systematic review and meta-analysis by Wang et al reported that in the year 2018, amongst children less than 5 years of age, there was an estimated 109 million new cases of influenza and 10.1 million influenza related acute lower respiratory infections (ALRI). In developing countries, there were 1.4 million cases of severe influenza-virus associated ALRI and 0.4 million cases of very severe influenza-virus associated ALRI.[5] The Global Initiative for asthma recommends influenza vaccination for individuals with moderate to severe asthma, while another systematic review by Vasileiou et al estimated the influenza vaccine to cause a 59-78% reduction in asthma related emergency department visits and hospitalizations.[6]

According to the most recent World Bank report of 2019, the mortality rate for children under 5 years of age is estimated to be 67 for every 1000 live births. A significant 70% of these deaths is secondary to infectious disease and its complications. To tackle this issue, the Extended Program on Immunization (EPI) was launched in Pakistan by WHO in the year 1978 and today includes immunization against tuberculosis, polio, tetanus, diphtheria, pertussis, H.influenza, hepatitis B, measles and rota virus. The importance of EPI cannot be stressed enough, being the primary source of immunizations for general population. Although EPI efforts have led to a significant reduction in childhood morbidity and mortality, the flu shot is yet to become a part of the program.

For the 2021-2022 season, there are currently two influenza vaccines available in the market, namely Influvac manufactured by Abbott and Vaxigrip manufactured by Sanofi. Both these vaccines are quadrivalent vaccines containing the following four strains: A/Victoria/2570/2019 (H1N1) pdm09-like strain, A/Cambodia/e0826360/2020 (H3N2)-like strain, B/Washington/02/2019-like strain, B/Phuket/3073/2013-like strain. This is the first year that the quadrivalent vaccine (IIV4) has been introduced in Pakistan, which compared to the earlier used trivalent vaccine (IIV3) has an additional Influenza B strain. An analysis by the US influenza Vaccine Effectiveness Network over four influenza seasons demonstrated IIV4 to provide additional protection against Influenza B as compared to IIV3.[7]

The cost of both these quadrivalent vaccines is around 12

Influenza Vaccine	Manufacturer	Type	Availability
Influvac	Abott	Quadrivalent	Available in Pakistan
Vaxigrip	Sanofi	Quadrivalent	Available in Pakistan
Afluria Quadrivalent	Seqirus	Quadrivalent	Not available in Pakistan
Flulaval Quadrivalent	GSK	Quadrivalent	Not available in Pakistan
Fluzone Quadrivalent	Sanofi	Quadrivalent	Not available in Pakistan
Fluarix Quadrivalent	GSK	Quadrivalent	Not available in Pakistan

dollars, which is a substantial sum of money for a country where the per capita income is less than 100 dollars per month. Alternatively, the cost of an in-patient hospitalization for severe pneumonia secondary to influenza exceeds 200 dollars, placing a significant economic burden on the health care system. This begs the question, will mass immunization of the high-risk population groups potentially reduce the economic burden flu places on our country each year? A large-scale study conducted within 25 EU countries estimated savings of 39 million euros from primary care visits with an additional savings of 1.52 billion euros from hospitalization if 100% of the high-risk population was vaccinated.[8]

In the current era with weakened immunity from either infection with COVID-19 or lack of exposure to other disease, we can certainly expect an extensive and severe flu season. With increasing costs of vaccination, there is dire need for a federal policy with the aim to increase influenza vaccine coverage in high-risk populations. This could be implemented in association with international programs as well as public-private partnerships such as the Global Alliance for Vaccines and Immunization (GAVI), which has previously supported the EPI program in Pakistan. The Ministry of Health, which has failed to recognize the needs of our population, should place their focus towards improving public health which would inadvertently reduce the economic burden of disease. It is certainly the need of the hour to develop a national "flu shot" program which would provide vaccination to high-risk population at the national, provincial and district level in collaborate with Civil Society Organizations (CSOs) to ensure adequate implementation of the program.

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