Mitigating the Burden of Seasonal Influenza on Cardiovascular Diseases in GCC Countries

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Cardiovascular diseases (CVDs) are the leading cause of death and one of the top contributors to disability worldwide.[1] Rapid urbanization, lifestyle changes, and an aging population have significantly contributed to the rise of CVDs worldwide, including in the Gulf Cooperation Council (GCC) countries.[2] Although influenza is primarily a respiratory illness, emerging evidence indicates that it has substantial cardiovascular implications; indeed, CVDs are among the most common comorbidities observed in hospitalized patients with influenza.[3] This editorial examines the intersection of influenza and CVDs in GCC countries and suggests future strategies.

The mechanisms linking influenza infection to CVDs remain an active area of investigation, with current evidence indicating roles for direct viral effects, systemic inflammation, or both.[4] For instance, individuals diagnosed with influenza have been reported to have a sixfold increased risk of myocardial infarction within the first week post-diagnosis.[5] Additionally, multiple studies have demonstrated a correlation between physician visits for acute respiratory infections or influenza-like illnesses and subsequent cardiovascular complications.[6]

Interim results from the ongoing FluHeart study strengthens these concerns: left and right ventricular dysfunction was present in 75% and 20% of hospitalized influenza patients, respectively, compared with matched general population controls.[7] The extent of impairment resembled that observed in hospitalized COVID-19 patients.[7] Furthermore, influenza has been associated with an increased risk of myocardial infarction, arrhythmia, stress cardiomyopathy, myocarditis, and pericarditis.

Likely, a combination of systemic complications of influenza may collectively contribute to impaired cardiac function. This may include secondary pulmonary hypertension, increased myocardial oxygen demand, hypoxemia, hypotension, a prothrombotic state, and potential direct viral effects.

CVDs account for 75% of deaths attributed to non-communicable diseases in the GCC region, making them a major public health concern.[3] The increasing prevalence of lifestyle-related risk factors, such as obesity, diabetes, hypertension, and physical inactivity, continues to drive this growing burden. Among GCC countries, Saudi Arabia bears the highest economic burden of CVDs, with Oman and Bahrain exhibiting similar trends.[3]

Hypertension affects approximately 25–30% of the Saudi population,[5,6,8] with similar prevalence trends observed in Kuwait and Oman. Diabetes, another major cardiovascular risk factor, affects 11–25% of adults in the GCC countries, ranking among the highest prevalence rates globally.[9] The coexistence of diabetes and hypertension significantly increases the risk of ischemic heart disease, heart failure (HF), and stroke, placing additional strain on already burdened healthcare systems.[10–12]

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Among the GCC countries, there are significant variations exist in the burden of HF. Between 1990 and 2019, Oman and Saudi Arabia experienced a notable rise in the age-standardized prevalence of HF (28.79% and 20.97%, respectively). The UAE recorded an increase in HF cases per 100 000 population, from 211 in 1990 to 401 in 2019. In contrast, Bahrain and Qatar reported declines of 9.66% and 3.78%, respectively, over the same period.[11,12] Additionally, the incidence of CV accidents has risen in parallel with the increasing prevalence of hypertension and diabetes, further emphasizing the urgent need for enhanced prevention and management strategies.[13] Against this backdrop, inadequate public awareness and poor adherence to preventive strategies continue to exacerbate the burden of CVDs.[10,11]

On the other hand, the management of ischemic heart disease and HF is particularly resource-intensive, requiring continuous care and costly medications.[12] The high prevalence of these conditions, combined with the financial burden of treatment and rehabilitation, poses a significant public health challenge to healthcare systems in GCC countries.

Influenza, which accounts for an estimated annual global mortality burden of 290 000 to 650 000 due to respiratory complications, is not merely a respiratory illness, but also has profound cardiovascular implications.[2] Multiple studies indicate that influenza infection can precipitate acute cardiovascular events, with the associated risk increasing up to sixfold within the first week following diagnosis.[13]

Influenza-related complications are particularly severe in older adults and individuals with chronic conditions such as CVDs, diabetes, obesity, pregnant persons, and healthcare workers.[7] With increasing life expectancy, the prevalence of comorbidities continues to rise, thereby elevating the risk of influenza infection and its complications.

Influenza vaccination is now increasingly recognized for its role in preventing CVD, particularly in high-risk populations. A thorough meta-analysis released in 2022—with 9001 participants of a mean age of 65.5 years; 52.3% having cardiac history—revealed that influenza vaccination was associated with a 34% reduction in the incidence of significant adverse cardiovascular events and a 45% decrease in cardiovascular mortality compared to non-vaccination.[14] Patients who had recently experienced acute coronary syndrome exhibited the most significant protective effects; HF patients also experienced comparable reductions.[15] These findings underscore the importance of incorporating influenza vaccination into CVD management protocols as an essential cost-effective strategy to reduce morbidity and mortality in vulnerable populations.

Although global guidelines recommend influenza vaccination for high-risk populations, vaccine uptake in the GCC countries remains suboptimal.[2] The World Health Organization sets a target of 75% coverage, yet GCC countries fall well below this benchmark. For instance, influenza vaccination coverage in Saudi Arabia is estimated at only 15%, while in Qatar, it stands at approximately 24%.[16] Several studies have identified key contributing factors, including low perception of personal risk, limited awareness of vaccine benefits, and fear of side effects.[16] Additionally, weak or absent recommendations from healthcare providers have been strongly associated with reduced vaccine uptake.[17] This highlights the urgent need for evidence-based interventions among healthcare professionals and the general population.

GCC countries face unique challenges in addressing the dual burden of influenza and CVDs. A study in Saudi Arabia highlighted the high mortality rates among Hajj pilgrims with chronic conditions, including CVDs, who contracted influenza. Similarly, studies have reported substantial mortality rates from influenza and pneumonia among individuals aged ≥ 65 years, with figures reaching 58 per 100 000 in the UAE and 60 per 100 000 in Saudi Arabia.[15] These statistics underscore the critical need for comprehensive preventive measures.

The economic impact of influenza-related cardiovascular complications is substantial, adding to the already high costs of managing CVDs. Treating CVDs directly cost the GCC countries approximately 1.8% of their gross domestic product, or US$525 per person. Given the region's high prevalence of diabetes and hypertension, which are key risk factors for both CVDs and severe influenza outcomes, addressing this intersection is critical.[18]

Given the high prevalence of diabetes and hypertension—both of which are key risk factors for CVDs and severe influenza outcomes—a coordinated public health response is imperative.

We suggest the following seven-point strategy for GCC countries:

1. **Integrate vaccination into CVD management**: National guidelines of GCC countries should recommend annual influenza vaccination for all CVD patients. Vaccines should be readily available at all community health centers, cardiology clinics, and primary care facilities.
2. **Train healthcare providers**: Cardiologists and primary care physicians should receive targeted training on the cardiovascular benefits of influenza vaccination, emphasizing its role in reducing complications among high-risk groups, especially older adults.
3. **Launch public awareness campaigns:** Educate the GCC communities about the link between influenza and CVDs, highlighting vaccination's protective role. Campaigns should aim to dispel misconceptions and promote public confidence in flu vaccines.
4. **Expand vaccine accessibility**: Ensure free or affordable access to influenza vaccines for all vulnerable GCC residents, regardless of nationality.
5. **Strengthen surveillance systems**: Evaluate the program's effectiveness by monitoring vaccination rates and their impact on cardiovascular outcomes.
6. **Foster collaboration**: Engage patient organizations and CVD support groups to advocate for vaccination and educate high-risk populations.
7. **Prioritize localized research**: Conduct region-specific studies to provide evidence on the cardiovascular benefits of influenza vaccination, informing policy and strengthening preventive strategies.

In the GCC countries, the intersection of influenza and CVDs poses a serious public health concern, further exacerbated by low vaccination rates and a high prevalence of risk factors such as aging, diabetes, and hypertension. We recommend a seven-point strategy to address this dual burden, including targeted vaccination programs, universal access to free/affordable influenza vaccines, public awareness campaigns, and robust surveillance systems. By prioritizing influenza vaccination as an integral component of comprehensive CVD management, GCC countries can reduce cardiovascular complications and enhance overall population health.

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