

## Influenza vaccination decreases the risk of cardiovascular disease in end stage renal disease patients

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*Madam*, Influenza is a viral respiratory tract infection that causes symptoms such as fever, sore throat, cough and runny nose with a mostly self-limiting prognosis. However, it can cause an increased risk of hospitalization and mortality in high-risk groups such as those suffering from end-stage renal disease (ESRD).<sup>1</sup> CVD is present in >50% of cases of ESRD and is associated with a 20 times greater relative risk of death than in the general population, particularly with patients infected with influenza.<sup>2,3</sup> This is due to the dysfunctional immunity in those affected by chronic kidney disease.

The pathophysiology behind the influenza infection leading to CVD in ESRD patients is due to the rise of acute phase reactants in response to viral infection markers triggering a systemic inflammatory reaction. This reaction comprises damage to the endothelial cell lining of vessels, impaired vasodilation, dysfunctional platelet activation, and elevated pro-coagulation. In addition, the increased metabolic demand and altered coronary vascular tone can bring about disruption and instability of atherosclerotic plaques in coronary arteries, thus inducing an acute coronary syndrome.<sup>1</sup>

Using influenza vaccine can significantly lower the risk of CVD in ESRD patients. Currently, available influenza vaccines include inactivated, recombinant, and live-attenuated (LAIVs).<sup>4</sup> Inactivated vaccines contain either surface glycoproteins such as haemagglutinin (HA) and neuraminidase (NA) or whole viral protein without the lipid envelope or chemically inactivated virus, whereas recombinant vaccines are composed of genetically synthesized HA subunits and LAIVs have the whole virus with weakened pathogenicity. These vaccines are produced as either trivalent (with both, influenza A subtypes H1N1 and H3N2 and dominant influenza B of either Yamagata or Victoria lineage) or quadrivalent (having

both influenza B lineages) vaccines.<sup>4</sup>

According to a population-based case-cohort study, annual influenza vaccinations have been seen to greatly reduce the hospitalisation rates for CVD in elderly patients with chronic kidney disease regardless of gender and influenza seasonality.<sup>5</sup> Moreover, it reduces the risk of CVD in patients with a hazard ratio of 0.74 for hospitalisation due to CVD among the vaccinated group compared to the non-vaccinated group, indicating a 26% lower risk and 35% reduction in overall mortality.<sup>3</sup>

Therefore, the protective mechanism of influenza vaccination may be beneficial in reducing the risk of hospitalisations and morbidity in ESRD patients by reducing the likelihood of cardiovascular-associated complications. Thus, it should be incorporated as an integral part of the management of ESRD.

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### References

1. Bhugra P, Grandhi GR, Mszar R, Satish P, Singh R, Blaha M, et al. Determinants of influenza vaccine uptake in patients with cardiovascular disease and strategies for improvement. *J Am Heart Assoc* 2021; 10: e019671.
2. Cozzolino M, Mangano M, Stucchi A, Ciceri P, Conte F, Galassi A. Cardiovascular disease in dialysis patients. *Nephrol Dial Transplant* 2018; 33(suppl\_3): 28-34.
3. Wang IK, Lin CL, Lin PC, Chang SN, Chou CY, Yen TH, et al. Seasonal influenza vaccination is associated with reduced morbidity and mortality in peritoneal dialysis patients. *Nephrol Dial Transplant* 2016; 31: 269-74.
4. Wiggins KB, Smith MA, Schultz-Cherry S. The Nature of Immune Responses to Influenza Vaccination in High-Risk Populations. *Viruses* 2021; 13: 1109.
5. Fang YA, Chen CI, Liu JC, Sung LC. Influenza vaccination reduces hospitalization for heart failure in elderly patients with chronic kidney disease: a population-based cohort study. *Acta Cardiologica Sinica* 2016; 32: 290-8.

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