

COVID-19 vaccine hesitancy in vascular surgery patients: insights from an Aotearoa New Zealand Centre

The coronavirus pandemic has seen more than 232 million people infected with SARS-CoV-2 (COVID-19) worldwide and over four million deaths (September 2021). Vaccination is a key public health measure for protecting populations from the consequences of COVID-19. In mid-2021, Pfizer-BioNTech was the only vaccine approved for nationwide rollout in New Zealand. Although evidence supports the benefits of high COVID-19 vaccination rates, there is also evidence of barriers that may prevent optimal vaccine coverage.¹

Patients with vascular diseases have higher rates of cardiac, renal and metabolic co-morbidities, and may be more susceptible to illness from COVID-19.^{2,3} There are also ethnic and socio-economic disparities in vascular disease which may influence vaccine hesitancy, along with factors such as age and trust in authority.^{1,2,4-7} Various reasons for vaccine hesitancy have been reported in studies of other high-risk patient populations.^{8,9}

This study aimed to benchmark the vascular surgical patient population against the wider New Zealand population, to assess COVID-19 vaccine hesitancy during the New Zealand Delta outbreak.

An observational study was undertaken at a single New Zealand tertiary centre beginning in September 2021, when the entire population over the age of 16 was eligible for vaccination. During a 4-week period, all inpatients and outpatients (face-to-face and telehealth consults) treated by the Vascular Surgery Department were offered the opportunity to voluntarily participate in a short survey. Vaccination status and attitudes towards vaccination were recorded from patient surveys with supplementation from online patient records of demographic and comorbidity information. Patients who did not complete surveys at their appointment and clinic non-attendees were followed up with a telephone survey. National ethics committee approval was waived due to the nature of the study, and the local hospital approved the conduct of the study.

In total, 179 inpatients and outpatients completed surveys with a response rate of 83%. The median age of respondents was 71 years (21–94), 61 (35%) were female and 37 (21%) identified as Māori. There were 151 (84%) respondents who had received at least one dose, including 123 (69%) fully vaccinated respondents. A further 19 (11%) respondents indicated they intended to be vaccinated. Among Māori respondents, there were 31 (83%) who had received at least one dose, including 25 (68%) who were fully vaccinated. A further four Māori respondents (11%) intended to be vaccinated.

Among 142 non-Māori respondents, 121 (85%) had received at least 1 dose, including 98 (69%) who were fully vaccinated, and a further 15 (11%) intended to be vaccinated. The most common reasons for vaccination were to prevent catching or getting ill from COVID-19 and to protect others.

At the end of the study period (7 October 2021), according to Ministry of Health data, 81% of the eligible New Zealand population had received at least their first vaccine dose (61% of Māori and 86% of non-Māori, non-Pacific people), including 53% who had received both doses (37% of Māori and 60% of non-Māori, non-Pacific people).¹⁰

We found slightly higher rates of one or more vaccination in less deprived areas (Decile 1–5), 50/57 (88%), compared to 102/122 (84%) in more deprived areas (Decile 6–10), though this was not significant ($p = 0.47$). There were 61/66 (92%) of respondents aged over 75 years who had received at least one vaccine compared with 11/17 (65%) of respondents aged 20–49 years.

Only eight (5%) respondents to our survey, including two Māori respondents, had not received a vaccine and did not plan to, termed ‘vaccine-hesitant’. Among those respondents, two patients lived in Decile 1–5 areas, and six lived in Decile 6–10 areas. The main reported concerns were potential side effects or thinking the vaccine was unsafe.

There were 101 patients with peripheral vascular disease and two or more co-morbidities (diabetes, hypertension, ischaemic heart disease, chronic obstructive pulmonary disease, cancer, kidney failure and smoking history). Within this cohort of patients, 82 (81%) patients had received at least one dose, with 71 (70%) fully vaccinated, and a further 13 (13%) intended to be vaccinated. There were five (5%) patients who did not intend to be vaccinated. Among the 78 patients in our survey who did not fit these criteria, 69 (88%) had received at least one dose, including 52 (67%) who had received both doses. A further six (8%) respondents intended to be vaccinated. There were three (4%) patients who did not intend to be vaccinated.

Vascular surgery patients attending outpatient clinics and inpatients in this study reported low rates of vaccine hesitancy. Our cohort had higher vaccination rates compared to the contemporaneous general population in national and regional data.¹⁰ Contrary to national statistics, we found more equitable vaccination rates between the Māori and non-Māori population in this study.¹⁰

Patients with peripheral vascular disease and two or more co-morbidities made up more than half of our patient cohort,

demonstrating the high prevalence of chronic co-morbidities among this population of patients. Reassuringly, we found equivalent vaccine uptake rates among these more at-risk patients compared to the New Zealand public.^{1–3,10}

Our findings align with current research, including national insights, on reasons for vaccine hesitancy.^{6,11} The staggered rollout of vaccines, with the elderly having been eligible for longer, may explain the age trend we observed.¹

Low socioeconomic status has been associated with increased prevalence of peripheral arterial disease.⁵ The same patients who we have found to have lower rates of COVID-19 vaccination uptake also have less access to healthcare, and are more susceptible to serious illness from COVID-19.^{1,2,4,5,11} Future interventions should focus on reducing healthcare gaps for vaccine-hesitant patients and ensuring that patients in more socio-economically deprived areas who intend to be vaccinated do not have barriers to receiving a vaccine.^{1,5} There is also the potential to implement equity-focused interventions to promote vaccine access and education for at-risk vascular patients, including those with multiple co-morbidities. These interventions are especially relevant now to increase the uptake of booster vaccinations, which were introduced after our study period.

The findings of this novel survey helped clinicians in our region counsel vaccine-hesitant vascular patients by providing a perspective on attitudes towards the COVID-19 vaccine. The recent Royal Australasian College of Surgeons guidance on COVID-19 vaccines, recommending all patients be fully vaccinated at least 2 weeks prior to surgery, also creates an opportunity for surgeons to engage with patients on the topic.¹² An on-going, national conversation regarding the role of the holistic vascular surgeon in vaccine promotion towards vaccine-hesitant, at-risk patients is essential.

Acknowledgements

Our thanks to the Waikato Hospital Vascular Department and registrars Dr. Calum Barton, Dr. Jemma Davies, Dr. Sinead Gormley, Dr. Elizabeth Suthers, Dr. Sam Taylor, and Dr. Zoe Vincent for their help in data collection. Open access publishing facilitated by The University of Auckland, as part of the Wiley – The University of Auckland agreement via the Council of Australian University Librarians.


Author contributions


Uma L. S. Sreedhar: Conceptualization; data curation; formal analysis; investigation; methodology; resources; writing – original draft; writing – review and editing. **Anantha Narayanan:** Conceptualization; data curation; formal analysis; investigation; methodology; resources; supervision; writing – original draft; writing – review and editing. **Manar Khashram:** Conceptualization; data

curation; formal analysis; investigation; methodology; resources; supervision; writing – original draft; writing – review and editing.

References

- Whitehead J, Scott N, Carr PA, Lawrenson R. Will access to COVID-19 vaccine in Aotearoa be equitable for priority populations? *N. Z. Med. J.* 2021; **134**: 25–35.
- Song P, Rudan D, Zhu Y *et al.* Global, regional and national prevalence and risk factors for peripheral arterial disease in 2015: an updated systematic review and analysis. *Lancet Glob. Health* 2019; **7**: E1020–30.
- Moridzadeh R, Sanaiha Y, Madrigal J *et al.* Medical complexity of patients by surgical specialty: who operates on the sickest patients? *J. Vasc. Surg.* 2019; **70**: e91–2.
- Selak V, Poppe K, Grey C *et al.* Ethnic differences in cardiovascular risk profiles among 475, 241 adults in primary care in Aotearoa, New Zealand. *N. Z. Med. J.* 2020; **133**: 14–27.
- Pande R, Creager M. Socioeconomic inequality and peripheral artery disease prevalence in US adults. *Circ Cardiovasc Qual Outcomes.* 2014; **7**: 532–9.
- Troiano G, Nardi A. Vaccine hesitancy in the era of COVID-19. *Public Health* 2021; **194**: 245–51.
- Thaker J. The persistence of vaccine hesitancy: COVID-19 vaccination intention in New Zealand. *J. Health Commun.* 2021; **2**: 104–11.
- Costantino A, Topa M, Roncoroni L *et al.* COVID-19 vaccine: a survey of hesitancy in patients with celiac disease. *Vaccine* 2021; **9**: 511.
- Costantino A, Invernizzi F, Centorrino E, Vecchi M, Lampertico P, Donato MF. COVID-19 vaccine acceptance among liver transplant recipients. *Vaccine* 2021; **9**: 1314.
- Ministry of Health. COVID-19: vaccination data. New Zealand. 2021 [Cited 13 Oct 2021]. Available from URL: <https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-data-and-statistics/covid-19-vaccine-data>
- Prickett KC, Habibi H, Carr PA. COVID-19 vaccine hesitancy and acceptance in a cohort of diverse new Zealanders. *Lancet Reg Health West Pac.* 2021; **14**: 100241.
- Royal Australasian College of Surgeons. Influence of COVID-19 vaccines on surgical practice. First Version [PDF on Internet]. South Australia. 2021 [Cited 23 Dec 2021]. Available from URL: <https://www.surgeons.org/-/media/Project/RACS/surgeons-org/files/news/covid-19-information-hub/RACS-FINAL-COVID-19-vaccine-and-surgery.pdf?rev=fdf3dd1f856849bcaa3d3cbd0ac162cd&hash=D7DF0A8B329BF7EC098988923A45624>

Uma L. S. Sreedhar,* 

Anantha Narayanan,† MBChB 

Manar Khashram,† MBChB, PhD, FRACS(Vascular) 

*Faculty of Medical and Health Sciences, University of Auckland – Grafton Campus, Auckland, New Zealand and †Department of Vascular Surgery, Waikato Hospital, Hamilton, New Zealand
The corresponding author, Uma L. S. Sreedhar, is not the recipient of a research scholarship. This paper is not based on a previous communication to a society or meeting

doi: 10.1111/ans.17742