



Impact of first dose of BNT162b2 vaccine on COVID-19 infection among healthcare workers in an Irish hospital

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Dear Editor,

The coronavirus disease 2019 (COVID-19) pandemic has had a significant and disproportionate impact on healthcare workers (HCWs) [1, 2]. In Ireland, from the start of the pandemic to week 15, 2021, 28,407 (11.6%) of 244,083 COVID-19 cases were among HCWs. Of these, 775 (2.7%) were hospitalized, 101 (0.3%) were admitted to critical care, and 17 HCWs died [3]. On the 21st of December 2020, the European Medicines Agency granted authorisation of the BNT162b2 vaccine, an mRNA vaccine produced by Pfizer Inc. and BioNtech administered as two doses. A variety of public health strategies for optimal pandemic control have been proposed including rapidly increasing the number of vaccinated individuals by halving doses or prolonging dosing intervals or concentrating available vaccine doses to specific at-risk patient groups [4]. Early reports from national vaccination campaigns have reported a significant improvement in COVID-19-related health outcomes after a single vaccination [5].

We report our experience of the impact of COVID-19 vaccination among HCWs in our institution during the first

8 weeks of the staff vaccination programme, in particular following the administration of the first dose of a two-dose schedule (BNT162b2 vaccine, two doses administered intramuscularly 21 days apart). The study population incorporated all permanently employed HCWs at the hospital ($n = 4458$). Staff vaccination commenced on 29 December 2020 at a time when the national incidence of COVID-19 was rising rapidly into the third wave. The third COVID-19 wave had a significant impact in Ireland, with over 40% of all deaths and over 50% of COVID-19 cases recorded from 1 January to 15 February 2021 [6]. The majority of HCWs received their first dose during the 8-week study period with some also receiving their second dose. We retrospectively reviewed the rates of COVID-19 among staff vaccinated with their first vaccine dose and unvaccinated staff between the 29th December 2020 and the 22nd February 2021.

The majority of staff (85%) received their first-dose vaccination over the study period (Table 1). During the study period, 1708 staff (38%) had a COVID-19 test, 1314 (77%) of which were known to have received their first vaccine dose. Positivity rates between the vaccinated and unvaccinated groups differed significantly with 5.8% of the vaccinated cohort testing COVID-19-positive versus 25.6% of those tested in the unvaccinated cohort (OR 0.18, C.I. 0.13–0.25, $p < 0.01$). Review of COVID-19 positive cases showed that the most common indication for SARS-CoV 2 testing in both vaccinated and unvaccinated HCWs was COVID-19 symptoms (49% vaccinated cohort and 61% unvaccinated cohort respectively); however, the unvaccinated cohort had a greater proportion of symptomatic staff, followed by close contact follow-up testing (29% and 22%). The majority of positive PCR results in vaccinated staff (65/77, 84.4%) were in the 14 days following their first dose vaccination. As evidenced by Table 1, a greater proportion

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Table 1 Demographics, SARS-CoV2 testing, BNT162b2 first dose vaccination and COVID-19 of 4458 healthcare staff from 29 December 2020 to 22 February 2021

	BNT162b2 first dose vaccination (n = 3805, 85%)	Not vaccinated (n = 653, 15%)
SARS-CoV 2 PCR performed	1314 (34%)	394 (56.8%)
SARS CoV 2 PCR positive	77 (5.8%)	101 (25.6%)
Indications for testing		
COVID-19 symptoms	38 (49%)	62 (61%)
Close contact status	22 (29%)	22 (22%)
Asymptomatic screening	13 (17%)	11 (11%)
Not documented	4 (5%)	6 (6%)
Duration between 1st dose vaccine and positive PCR		
0–7 days	26	N/A
8–14 days	39	
15–21 days	5	
22–30 days	6	
39 days	1	

of unvaccinated HCWs were tested, COVID-19 positive and symptomatic.

The impact of a single vaccination in HCWs has been noted in the UK (single dose of BNT162b2 vaccine demonstrated vaccine effectiveness of 72%) and in the USA (2.61% COVID-19 in unvaccinated HCW, 1.82% in partially vaccinated HCW and 0.05% in fully vaccinated HCW) [7, 8]. Our experience reflects the positive impact of vaccination on COVID-19 incidence, even in those who are partially vaccinated. The implementation of HCW vaccination in Ireland has been reflected with a decreasing proportion of HCW COVID-19 cases in national reports in the first 3 months of 2021 [3]. In addition to reducing SARS-CoV-2 acquisition and transmission, COVID-19 vaccination preserves the HCW workforce at a time when it is most required, with reductions in the generation of HCW COVID-19 cases and close contacts. While our study is limited by its retrospective nature, the differing HCW PCR positivity rates between vaccinated and unvaccinated HCWs, even after a single vaccination, highlight the key role of COVID-19 vaccination in this pandemic, and the importance of rapid first dose roll out, not just in HCWs but also in the Irish population as a whole.

Declarations

Ethical approval This research was conducted retrospectively from data obtained for clinical purposes. It was registered with the Clinical Governance Department at Beaumont Hospital under the registration number CA2021/120.

Conflict of interest The authors declare that they have no conflict of interest.

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