



Letter to the editor

Effectiveness of BNT162b2 vaccine against the B.1.1.7 variant of SARS-CoV-2 among healthcare workers in Brescia, Italy.



To the editor

On 27th December 2020 the vaccine campaign against SARS-CoV-2 started in Europe. Because of the high risk and their crucial role in tackling SARS-CoV-2 pandemic, healthcare workers (HCWs) were the first target population group. At the tertiary hospital “ASST Spedali Civili” of Brescia, Italy, a main European COVID-19 hospital, HCWs were vaccinated with a two-dose (21-day interval) schedule of BNT162b2 vaccine (Pfizer®), which had shown an efficacy of 95% in the prevention of COVID-19.¹ Encouraging data have been recently highlighted by reports dealing with in-mass vaccination campaign on HCWs in Israel and USA.^{2–4} The present study was performed with the main aim of evaluating the effectiveness of BNT162b2 among HCWs while a recrudescence of pandemics was hitting the Brescia county, with a high rate of the **B.1.1.7** variant.

The study was performed in the context of the mandatory health surveillance at the workplaces. The analysis covers the period between 25th January 2021 (when the first vaccinated workers theoretically gained the full protection, i.e. after at least 7 days from the second dose) and 13th April 2021, when 6904 HCWs (78% of workforce) had gained the full protection. We monitored the SARS-CoV-2 infection and COVID-19 symptoms among HCWs classified by having received the full vaccine schedule or not. The SARS-CoV-2 infection was diagnosed by conventional RT-PCR on rhino-pharyngeal swabs, followed by gene sequencing in positive vaccinated HCWs. The cumulative incidence of infections in the period were normalized by 10,000 people, to allow comparison between HCWs and general population (Brescia county).

Figure 1 shows the cumulative daily standardized ($\times 10^{-4}$ people) incidence of SARS-CoV-2 infections among not vaccinated and vaccinated HCWs and in the general population. At the end of

the observation period, vaccinated HCWs were at lower infection risk as compared to unvaccinated HCWs (by 2.6-folds), and even to a greater extent (6.2 folds) if compared to the general population. Interestingly, in the last weeks, the infection trends between HCWs reached a plateau, before among vaccinated then among non-vaccinated, whereas in the general population the infections were still raising. In the observation period, we observed 92 SARS-CoV-2 infections among HCWs, most among unvaccinated HCWs, the vaccine showing a significant protective effect against symptom development (Table 1). Among vaccinated HCWs, gene sequencing was successful in five cases only, 4 **B.1.1.7** and 1 B.1.525 variants. Overall, in the same period, Lombardy (10,025,503 inhabitants) registered 244,641 confirmed COVID-19 cases, 48,056 of which in the Brescia county (1,247,583 inhabitants); the incidence rate of the **B.1.1.7** variant rose from 70% (18th February) to 97% (28th March).⁵

Obtained results confirm the protective effects of BNT162b2.^{1–4} Noteworthy, results were observed while a recrudescence wave of the SARS-CoV-2 pandemic hit Lombardy and particularly the Brescia county, where the **B.1.1.7** variant was highly prevalent. Obtained data show that the vaccine campaign was effective not only in reducing the appearance of symptoms but also in decreasing the incidence of infections among vaccinated HCWs. We observed a reduced infection rate also among the residual unvaccinated HCWs. Such evidence could be explained by a sort of herd immunity, possibly resulting by a positive interaction between in-mass vaccination and the complex of protective measures operating in the hospital. The high rate of unsuccessful gene sequencing observed among infected vaccinated workers could be explained by a low viral burden, possibly related to a lower risk of SARS-CoV-2 transmission. Transition to endemicity of SARS-CoV-2 is thought to be the most probable epilogue to this pandemic.⁶ We believe that a state of mild disease endemicity will be possible through extensive vaccinations campaign. Vaccination for COVID-19 should be made mandatory in all occupational contexts in which a high infective risk is present.

Table 1

Distribution of COVID-19 symptoms in SARS-CoV-2-positive healthcare workers (HCWs) classified by having received a full vaccine schedule (two doses with a 21-day interval) in the period January 25th - April 13th 2021.

Fully vaccinated HCWs, N (%)	SARS-CoV-2 positive HCWs, N (%)		OR (95% CI); p value
	Symptomatic	Asymptomatic	
Yes 40 (43%)	15 (37%)	25 (63%)	0.39 (0.17–0.91); p<0.05
No 52 (57%)	32 (62%)	20 (38%)	

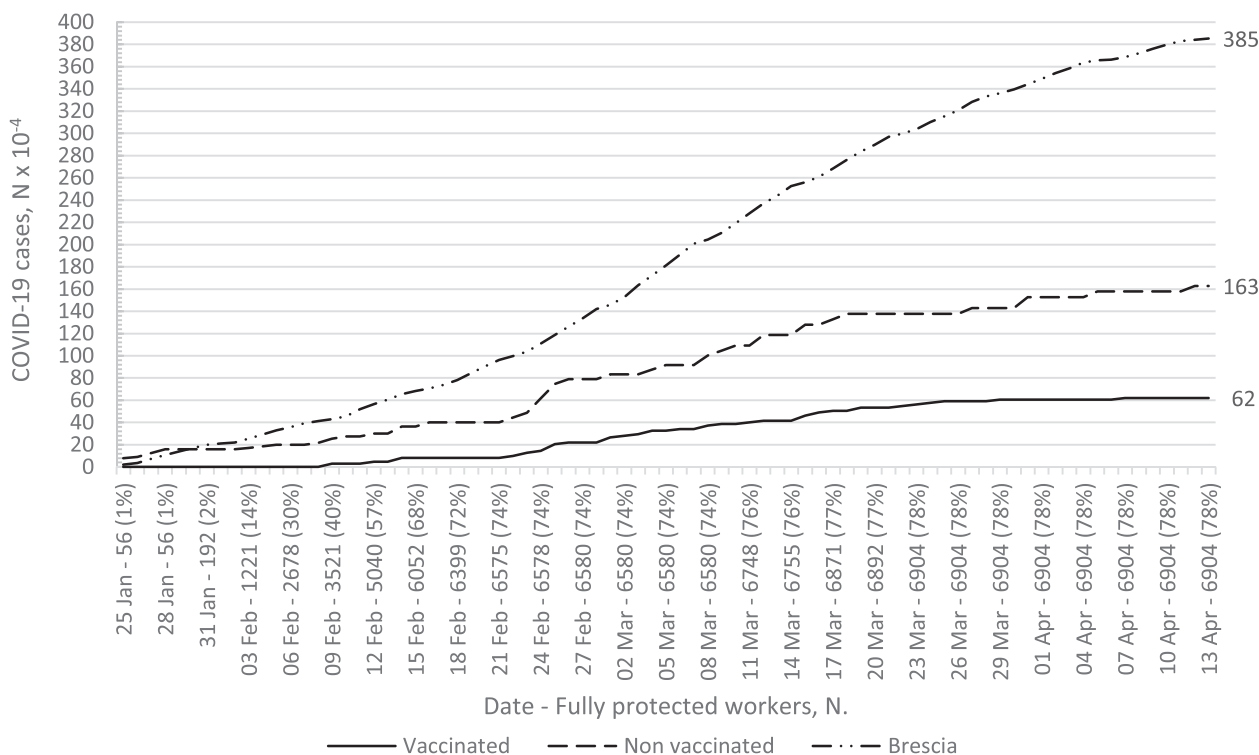


Figure 1. Cumulative standardised incidence per 10,000 people of SARS-CoV-2 positive cases among vaccinated and not vaccinated healthcare workers and general population between January 25th and April 13th 2021. Total number of workers which had gained theoretical full protection from vaccine is reported on the horizontal axis along with its percentage.

REFERENCES

1. Polack FP, Thomas SJ, et al. Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine. *N Engl J Med* 2020 Dec 31;383(27):2603–15.
2. Benenson S, Oster Y, et al. BNT162b2 mRNA Covid-19 Vaccine Effectiveness among Health Care Workers. *N Engl J Med* 2021 Mar 23.
3. Daniel W, Nivet M, et al. Early Evidence of the Effect of SARS-CoV-2 Vaccine at One Medical Center. *N Engl J Med*. 2021 Mar 23.
4. Keehner J, Horton LE, et al. SARS-CoV-2 Infection after Vaccination in Health Care Workers in California. *N Engl J Med*. 2021 Mar 23.
5. <https://statistichecoronavirus.it/coronavirus-italia/consulted> on-line on April 1st 2021.
6. *Science* 12 Feb 2021;371(6530):741–5.

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