

Sick leave request following anti-COVID-19 vaccine administration is low among healthcare workers: results from a retrospective cross-sectional monocentric study

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Abstract. – **OBJECTIVE:** Anti-COVID-19 vaccines were mainly associated with non-serious adverse events (AEs), whose prevalence was reported to be up to 70% in healthcare workers (HCWs). This may lead to sick leave requests, but this impact has never been quantified. This study aimed to investigate the absence from work among HCWs following anti-COVID-19 vaccination. Its association with age and previous COVID-19 infection was also assessed.

PATIENTS AND METHODS: This is a retrospective observational cross-sectional study on administrative data about sick leave requests after anti-COVID-19 vaccination. All the HCWs employed at the Niguarda Hospital (Milan, Italy) who received the vaccine from December 27, 2020 to February 28, 2021 were included.

RESULTS: In total, 4,088 HCWs received the first dose of the vaccine and 4,043 completed the vaccination cycle. After the first injection, 1.6% of HCWs requested sick leave, while after the second injection, the number of requests significantly increased (+6.1%, $p<0.001$). A significant increase in sick leave was detected for those who have had SARS-CoV-2 infection after the first injection (+2.3%, $p<0.001$). After the second dose, a significant increase in sick leave was observed in the 20-30-year-old group compared to >30 years (+3.6%, $p=0.017$), if HCWs without a history of SARS-CoV-2 infection were considered.

CONCLUSIONS: The requests for sick leave among HCWs following the anti-COVID-19 vaccine were limited and higher after the second injection. This may help the management of the human resources when the large-scale administration of the anti-COVID-19 vaccines will involve other categories of workers.

Key Words:

Anti-COVID-19 vaccine, Sick leave, Healthcare workers, Non-serious adverse events.

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) led to the coronavirus disease 2019 (COVID-19) pandemic in 2020, causing a high risk of severe disease and death, mainly in the elder population with comorbidities and frailty¹. Healthcare workers (HCWs) were also heavily affected since the very beginning of the pandemic. During the first 5 months, a total of 152,888 infections and 1,413 deaths were reported among HCWs worldwide² and, in Italy, HCW contagions accounted for more than 5% of all national cases³. Consequently, the availability of HCWs was drastically reduced

and this may have hampered the activities of the national healthcare systems (NHS) in coping with the pandemic.

Therefore, HCWs were selected in most national health policies as one of the first target groups to receive the vaccine against COVID-19. In European countries, the BNT162b2 mRNA vaccine has been administered to HCWs since 27 December 2020. In Italy, by 10 March 2021, 124,003 HCWs were diagnosed, accounting for 4% of the total number of cases since the beginning of the pandemic. A decrease in diagnosed cases was observed in the second half of January 2021 and may be attributed to the vaccination of HCWs, consistent with the first real-life data on HCWs in other countries^{4,5}.

Anti-COVID vaccines were confirmed to be mainly associated with non-serious adverse events (AEs), whose prevalence was reported to be up to 70% in HCWs, as well as in the general population^{6,7}. A proportion of these AEs may be expected to be a reason for sick leave requests in the short-term post-vaccination period, with an effect on the scheduling of the healthcare activities, but this hypothetical impact has not been quantified so far.

This study aimed to investigate the absence of HCWs from work after being administered the anti-COVID-19 vaccine. Its association with age and previous COVID-19 infection was also assessed.

Patients and Methods

This is a retrospective observational cross-sectional study on administrative data regarding the requests of sick leave after the anti-COVID-19 vaccination of HCWs employed at the Niguarda Hospital in Italy.

All HCWs who received the anti-COVID-19 BNT162b2 mRNA vaccine from 27 December 2020 to 28 February 2021 were eligible if formal sick leave requests, independently of the cause, were countable and tracked in the administrative database, limited to the typical employment relationship. The number of days of sick leave was the main outcome of the study. Any certified absence was counted as sick leave; whole days of absence from work were accounted. To focus on the sick leave requests related to vaccination, the analysis was restricted within the 3 days after vaccination and whose duration was inferior to 5 days. Age groups and any SARS-CoV-19-positive

test in the previous year were also considered. Absolute and relative frequencies were reported to describe the distributions of the main outcome and other variables. Two-tailed tests of the difference of two proportions for large samples were performed and 95% Wald confidence intervals (CIs) were calculated. All the analyses were conducted using Stata Statistical Software Release 15 (StataCorp. 2017, College Station, TX, USA: StataCorp LLC).

This is an ancillary study conducted within the main study approved by the Ethics Committee Milano Area 3 (register number 16-14012021) and in compliance with Helsinki's Declaration.

Results

Out of 5,280 HCWs, 4,088 (77%) employees were eligible. A total of 66% (n=2698) were women, 10% were <30 years, 21% were 30-39 years, 23% were 40-49 years, 35% were 50-59 years and 10% were >60 years. Of them, 4,043 (99%) completed the cycle of two vaccinations.

After the first injection, 1.6% (n=66, 95% CI: 1.2-2.1%) of HCWs requested sick leave, while after the second injection, the number of requests was higher (n=312, 7.7%, 95% CI: 6.9-8.6%) with a significant increase of +6.1% (95% CI: +5.2-7.0%; $p<0.001$).

The mean absence from work was 2 days (standard deviation=1), after both the first and the second injection.

Among the 66 patients who requested a sick leave after the first injection, one did not receive the second injection. In the remaining 65 patients, 58% (n=38) also took sick leave after the second dose.

A history of SARS-CoV-2 positivity was recorded for 775 HCWs (19%) and, among them, 4.5% did not receive the second dose of vaccination. Among HCWs without a history of SARS-CoV-2 positivity (n=3313, 81%), 0.3% did not complete the two-dose cycle, with a significant difference of -4.2% compared with HCWs known for a history of infection (95% CI: -2.7% to -5.7%, $p<0.001$).

By stratifying HCWs according to a previous history of SARS-CoV-2 infection, 3.5% (n=27, 95% CI: 2.3-5.0%) of positive employees were absent from work after the first dose and 8.6% (n=64, 95% CI: 6.7-10.9%) of positive employees were absent from work after the second dose; this difference was statistically significant (+5.2%, 95% CI: +2.7-7.6%, $p<0.001$).

Similarly, in those who had not had the SARS-CoV-2 infection, 1.2% (n=39, 95% CI: 0.8-1.6%) of HCWs were absent from work after the first dose and the 7.5% after the second dose (n=248, 95% CI: 6.6-8.5%), with a statistically significant increase of +6.3% (95% CI: +5.4-7.3%, $p<0.001$).

Compared with HCWs without a history of infection, previously positive employees were absent from work more frequently after the first dose (+2.3%, 95% CI: +1.0-3.6%, $p<0.001$), but not significantly after the second (+1.1%, 95% CI: -1.1-3.4%, $p=0.294$).

The number of sick leave requests is not significantly different in relation to age groups, regardless of history of SARS-CoV-2 infection, both after the first and the second dose (Figure 1A). Notably, after the second injection, a significant increase of sick leave requests was observed in the 20-30-year-old group compared with the >30-year-old group (+3.6%, 95% CI: +1.8-7.1; $p=0.017$), if HCWs without a history of SARS-CoV-2 infection were considered only.

The distribution of the sick leave requests according to the time of the request (1-3 days post-vaccination) was also analyzed (Figure 1B),

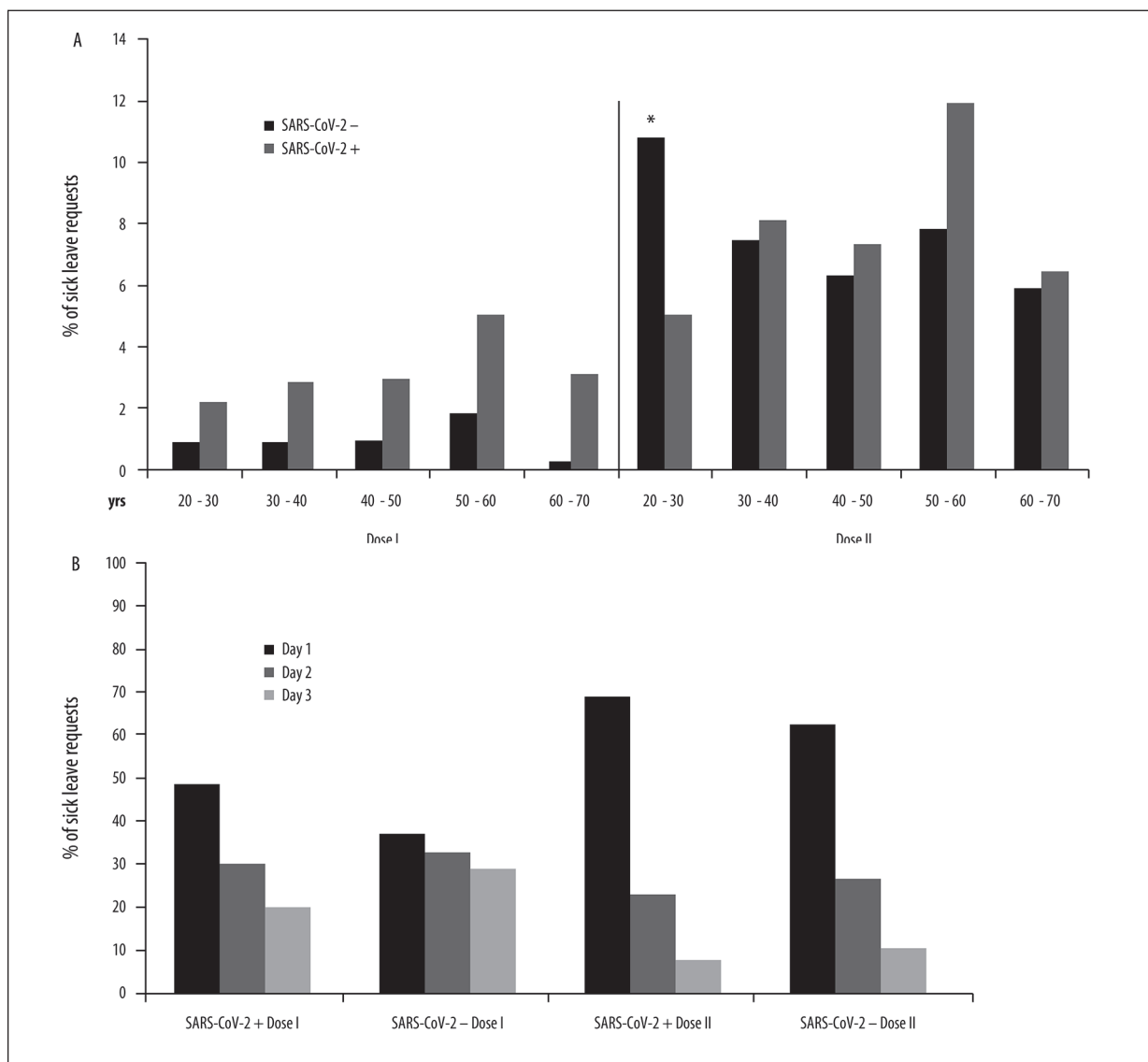


Figure 1. Distribution of the sick leave requests among healthcare workers after the anti-COVID-19 vaccination, in relation to the history of SARS-CoV-2 positivity and age (A) or at the moment of the sick leave request (B). * $p<0.05$, 20-30-year-old group compared with the >30-year-old group.

considering the history of positivity to SARS-CoV-2. Both after the first and second dose, most HCWs who were on sick leave were absent during the first day after the vaccination, while a lower decrease was observed in the second and the third days, regardless of history of SARS-CoV-2 infection.

The mean number of days of absence from work was 2 (SD=1) both in those with and those without a history of SARS-CoV-2 infection after the first and the second injection.

Discussion

Non-serious AEs related to the anti-COVID-19 vaccine may be a reason to request sick leave among workers. In this study, we observed that a small number of sick leave requests were registered (1.6% after the first dose, 7.7% after the second dose). Sick leave requests after the second injection were significantly higher (+6.1%) compared with the first dose ($p<0.001$). A significant increase in sick leave was observed for HCWs who have had SARS-CoV-2 in the past, with regards to the first injection (+2.3%, $p<0.001$). After the second dose, a significant increase of sick leave is observed in the 20–30-year-old age group compared with the >30-year-old age group (+3.6%, $p=0.017$), if HCWs without a history of SARS-CoV-2 infection were considered. Greater reactogenicity after the second dose was consistently reported both in phase II/III clinical trial⁸ and in the active surveillance system fostered by the Centers for Disease Control and Prevention in the USA⁶. Conversely, the association between reactogenicity and previous history of SARS-CoV-2 infection was still unclear⁸.

Regarding the role of age, reactogenicity was found to be less pronounced in those who were >65 years⁶. Interestingly, our results are consistent with these findings if reactogenicity is assumed to be related to sick leave, which was higher in the 20-30-year-old age group compared with the elder HCWs who were not known to have had the SARS-CoV-2 infection.

It has been highlighted that a vaccination campaign targeted to HCWs is related to a reduction of sick leave due to such an infection⁹, but to our knowledge, these are the first data about the impact of vaccination on generating sick leave requests in close proximity to the vaccination. However, the impact of vaccination in

the prevention of infectious diseases is expected to largely counterbalance the temporary sick leave due to AEs.

This study had several limitations. First, administrative data were used and clinical characteristics, such as comorbidities, were not accounted for. Secondly, sick leaves among HCWs who were vaccinated before non-working days could not be recorded and the number of requests could be underestimated. Finally, younger age groups, which may have frequently an atypical form of employment, might have been underrepresented.

Conclusions

The overall requests of sick leave among HCWs who received the BNT162b2 mRNA vaccine were limited and significantly higher after the second injection. This observation may help the management of the human resources in the healthcare system, as well as in other working environments when the large-scale administration of the anti-COVID-19 vaccines to the population will involve other categories of workers.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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Availability of Data and Material

This study did not generate dataset(s) and data are available as published in the manuscript.

Authors' Contribution

Alice Schianchi, Nicola Ughi and Oscar Epis contributed to the study conception and design; data collection and analysis were performed by Nicola Ughi, Alice Schianchi and Giuseppe Cassano. Data interpretation: all. The first draft of the manuscript was written by Alice Schianchi and Nicola Ughi. All authors approved the final manuscript after revising it critically for important intellectual content.

Compliance with Ethical Standards

This is an ancillary study conducted within the main study approved by the ethics committee Milano Area 3 (register number 16-14012021) and in compliance with Helsinki's Declaration. Institutional aggregated data from the administrative database were used to perform the analyses and did not contain information from which individuals could be identified. For this type of retrospective study, formal consent was not required.

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