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LETTER TO THE EDITOR

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COVID-19 vaccine side effects among nursing home residents and staff

Coronavirus 2019 (COVID-19) has disproportionately affected nursing home (NH) residents, accounting for at least one-third of COVID-19 deaths. Moderna and Pfizer-BioNTech messenger RNA (mRNA) COVID-19 vaccines are highly effective and safe in preventing severe COVID-19 disease.[1–3] Consequently, NH residents and staff were vaccinated through the CDC's Pharmacy Partnership of Long-Term Care Program[4] clinics.

Despite proven vaccine effectiveness, vaccine hesitancy among NH staff has been a considerable barrier to vaccination, with majority of hesitant staff reporting concerns about adverse effects (70%).[5] For NH residents, scarce information about adverse effect data exists as vaccine trials have generally excluded them, although COVID-19 vaccine administration has been deemed to be safe in older adults.[6–9]

In this prospective observational study, we examined the proportion of NH residents and staff who reported localized and systemic side effects after administration of the Moderna COVID-19 vaccine. Our study population included 193 individuals who received the first dose (124 residents and 69 staff) and 207 individuals who received the second dose (105 residents and 102 staff) in two NHs in Southeast Michigan between January 7 and February 6, 2021. The study team provided each NH leadership with a vaccine side effect data collection form (Appendix A) that included a symptom diary, new medical conditions, illnesses or injuries, new medications used following vaccination, and health care use other than routine check-ups within 8 days following vaccination. NH staff completed the vaccine side effect data collection form for each resident and returned it to their NH leadership. Deidentified data collection forms were sent to the study team for data extraction. Each NH coordinated with the CDC's Pharmacy Partnership of Long-Term Care Program to provide COVID-19 mRNA (Moderna) vaccine clinics to vaccinate residents and staff.

Adverse effects were reported less frequently with the first dose (63% of residents and 84% of staff) than with the second dose (92% of residents vs. 99% of staff) (Table 1). The most common localized adverse effect was injection site pain, more frequently reported with the second dose than the first dose (81% of residents and 94% of staff vs. 56% of residents and 65% of staff, respectively). Other localized adverse effects included swelling and redness at the injection site. The most common systemic adverse effect was fatigue, more frequently reported with the second dose than with the first dose (89% of residents and 91% of staff vs. 55% of residents and 58% of staff). Other systemic adverse effects included headache, nausea/vomiting, myalgias, arthralgias, and chills. No anaphylactic reactions, new medical conditions, illnesses, or injuries were reported among residents or staff. Regarding health care use, one resident was hospitalized on Day 2 after the first dose for a reason unrelated to the vaccine. One staff visited urgent care due to fever of 101.3°F on Day 1 following their second dose and one staff had an emergency room visit on Day 5 after their second dose.

Although adverse events were reported among NH residents and staff, additional treatment outside their usual care was rarely needed. Higher rates of adverse events were reported among NH residents compared to individuals aged 65 years and older in the Phase 3 Moderna vaccine trial,[10] however, NH residents were not included in this trial. Although nearly all (99%) NH staff reported at least one adverse effect, symptoms were managed symptomatically.

Study limitations include a small sample size, limited postvaccination observation period, lack of chart reviews to evaluate for adverse events of NH residents as information was limited to adverse events documented in the data collection form completed by NH staff. Also not collected were data on previous SARS-CoV-2 infection diagnoses and demographic characteristics. Attempts to obtain adverse effects information after booster vaccine administration were unsuccessful, with one NH declining to participate and one NH not responding to the request.

Our findings on adverse effects among NH residents align with safety trials previously published.[10] Our findings on adverse effects among staff align with results from Kadali et al.[11] based on an online survey of 432 healthcare workers who received the Moderna COVID-19 vaccine. The authors identified similar adverse effects such as localized pain, generalized weakness, headache, myalgia, chills, fever, nausea, and others in order of frequency. Few healthcare workers required help from an outpatient provider (3.94%), one (0.23%) from the emergency department, and none was hospitalized. Our findings support this published work by including healthcare workers in a NH setting.

Efforts to increase vaccination coverage are critical to reducing the risk for COVID-19-related hospitalization, particularly among older adults. Understanding vaccine effectiveness, safety, and occurrence of transient adverse events of COVID-19 vaccine can decrease vaccine hesitancy and help protect NH residents and staff.

TABLE 1 Moderna mRNA COVID-19 vaccine adverse effects

	Staff		Residents		Individuals aged 65 and older[10]	
Adverse events	Dose 1 (*N* = 69)	Dose 1 (*N* = 124)	Dose 2 (*N* = 105)	Dose 2 (*N* = 102)	Dose 1 (*N* = 3762)	Dose 2 (*N* = 3962)
Localized AE						
Any	81.2%	62.1%	87.6%	98.0%	74.6%	83.8%
Injection site pain	65.2%	55.6%	81.0%	94.1%	74.0%	83.2%
Swelling	46.4%	48.4%	41.9%	50.0%	4.4%	10.8%
Redness	42.0%	36.3%	42.9%	44.1%	2.3%	7.5%
Systemic AE						
Any	65.2%	57.3%	92.4%	93.1%	48.3%	71.9%
Fatigue	58.0%	54.8%	88.6%	91.2%	33.3%	58.3%
Headache	52.2%	43.5%	56.2%	68.6%	24.5%	46.2%
Nausea/vomiting	40.6%	37.1%	33.3%	52.9%	5.2%	11.8%
Muscle aches	44.9%	36.3%	57.1%	79.4%	19.7%	47.1%
Joint pain	36.2%	31.5%	44.8%	52.0%	16.4%	35.0%
Chills/shivering	37.7%	24.2%	58.1%	63.7%	5.4%	30.9%
Fever	0.0%	0.0%	0.0%	0.0%	0.3%	10.0%
Anaphylaxis	0.0%	0.0%	0.0%	0.0%		
Other	0.0%	0.0%	0.0%	0.0%		

Abbreviations: AE, adverse event; COVID-19, coronavirus 2019; mRNA, messenger RNA.

AUTHOR CONTRIBUTIONS

Study concept and design: Sankalp Bhatnagar, Karen Jones, and Ana Montoya. *Acquisition of data*: Sankalp Bhatnagar and Karen Jones. *Analysis and interpretation*: Sankalp Bhatnagar, Karen Jones, and Ana Montoya. *Preparation of manuscript*: Sankalp Bhatnagar, Karen Jones, and Ana Montoya.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.