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Letter to the Editor

Reduced mortality rate after coronavac vaccine among healthcare workers



Healthcare workers have a high risk of exposure to the coronavirus disease-2019 (COVID-19)¹ and we lost many colleagues during this pandemic worldwide. As healthcare workers are high risk, they are one of the main groups for vaccine trials and population studies which its importance increased during pandemic due to prioritisation of healthcare workers for COVID-19 vaccine.

COVID-19 vaccination is the most efficient way to control the pandemic and there are different types of vaccines. Haas et al. reported the effectiveness of the Pfizer–BioNTech mRNA COVID-19 vaccine BNT162b2 at the population level in Israel.² *CoronaVac* (Sinovac Life Sciences, Beijing, China) is an inactivated whole virion vaccine^{3–4} and no study evaluating its impact on population level has been presented yet. In Turkey, COVID-19 vaccinations began in mid-January and more than one million healthcare workers (more than 95% of all workers in the healthcare industry) got their first dose within one week. The vaccination program is two doses of 3 mcg, 28 days apart. Healthcare workers got their second shots in mid-February and it can be assumed that they have maximum protection beginning from mid-March. Only CoronaVac was available until April. The purpose of this study is to evaluate the effectiveness of CoronaVac at the population level among healthcare workers. In Turkey, data for researchers is limited, therefore, we used available data from websites of Ministry of Health and Medical Chambers (two organisations not cooperating despite the pandemic). We used the number of daily cases and daily deaths from Ministry of Health⁵ and the number of death of healthcare workers from Medical Chambers in which names also listed by dates.⁶ Table shows number of deaths in all residents (*ALL*) and in healthcare workers which presented in two categories: all healthcare workers (including such as ambulance driver, security worker, pharmacy technicians, **HCW**) some of which had vaccination right later and selected subgroup (doctors, nurses, pharmacists and dentists only, **SEL**) which had vaccination right from the beginning (Table 1).

From the table it can easily be observed that the ratio of the death of selected healthcare workers to all residents (*SEL/ALL*) decreased after vaccination. Probably there were vaccinated patients among all residents and without vaccination the number of all deaths would increase and the ratio of death of selected health workers to all residents (*SEL/ALL*) would further decrease. There are two more factors that should be considered. In Turkey, we face third and the most severe peak now and most of the cases are due to UK variant⁷ which may related to increased mortality.⁸ Number of healthcare worker deaths declined despite high number of cases and new variants, this is more striking if we compare two periods

(March 2020–January 2021 to April–May 2021) in which they have 2.5 million vs 1.8 million new cases, first one without any vaccine effect and second one under vaccination era.⁵ There were 227 versus 17 deaths, indicating about 90% protection from death. Since there are 17 deaths in the second period, we also investigated vaccination status of this 17 deaths by personal communication and found half of them (8/16, 1 unknown) did not begin or find time to complete second dosage supporting a protection death rate of nearly 95%, but not 99–100%. We also compared ages of vaccinated deaths to pre-vaccination deaths, mean age 70 vs 62 years, respectively. The youngest patient was 56 years in the vaccinated group, but there were 54 deaths (28%, 54/194) younger than 55 years in the pre-vaccination era.

In addition, all of eight vaccinated deaths were associated with at least one risk factor (renal transplantation 1, multiple myeloma 1, severe chronic obstructive lung disease 1, heart disease 3, diabetes and obesity 1, older than 70 years 4) which may require modification of vaccination programs such as 2 × 6 mcg or 3 × 3 mcg in high risk patients.

Turkish healthcare workers are an ideal group to evaluate the efficacy of CoronaVac vaccine at the population level because:

- (1) There are more than one million healthcare workers in whom more than 95% got vaccinated
- (2) They completed vaccination program and had protection before the surge of third peak
- (3) Only Coronavac was available in Turkey until April
- (4) Data of Turkish Medical Chambers is reliable.

There are also other potential confounders that should be discussed such as improvement in management and diagnosis of COVID-19 disease. In Turkey, Ministry of Health's Scientific Board prepared guidelines during pandemic. After 2–3 months adaptation period there were not any significant practical changes in the diagnosis and management of COVID-19 disease, therefore, these improvements' effect on our conclusion is minimal.

Despite vaccination, healthcare workers continued to have COVID-19 infection, but less than prevaccination period. Since the data is limited and we do not know how many healthcare workers had infected, we were not able to estimate its efficacy about on disease protection. Our personal experience is most of the vaccinated, infected and symptomatic healthcare workers had mild disease. In addition, the causes of continuation of high infection rates among overall population can be due to high *R*₀, low vaccination rate and inadequate social restrictions. This data documents an efficacy of CoronaVac in the protection of death at the population level for the first time and we hope this protection to last long.

There is no conflict of interest.

Table 1

Number of deaths in three periods. ALL=All residents, HCW=All healthcare workers, SEL=Only doctors, nurses, pharmacists, dentists, Ratio: SEL/ALL.

Period	Months	Total number of cases	All deaths	HCWdeaths	SELdeaths	Ratio%SEL/ALL
Pre-vaccination	2020 March-2021 January	2.477.463	25.993	367	227	0.9
Transition	2021 February-March	839.719	5544	30	19	0.3
Postvaccination	2021 April 1–May 17	1.810.366	13.446	30	17	0.1

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