



## The Effectiveness of Covid-19 Vaccines in Improving the Outcomes of Hospitalized Covid-19 Patients

Welaia A Alsaffar\*

Department of Internal Medicine, Dammam Medical Complex, Dammam, KSA

\*Corresponding author: Alsaffar WA, Department of Internal Medicine, Dammam Medical Complex, Dammam, KSA, E-mail: walsaffar@moh.gov.sa

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### Introduction

Understanding of the coronavirus disease 2019 (Covid-19) is evolving; the nature of the spread and the severity of illness prompted widespread attempts to identify and understand the disease. Rapid identification and sequencing of the virus allowed scientists-with the help of research centers and biotechnical companies to begin developing preventive vaccines quickly. Vaccination is now considered the most promising approach for ending or containing the coronavirus disease 2019 (Covid-19) pandemic [1]. Covid-19 vaccine development had progressed through preclinical evaluation and underwent three clinical phase trials. Pfizer-BioNTech and Oxford-AstraZeneca Covid-19 vaccines have shown high efficacy against disease in phase 3 clinical trials and are now being used in national vaccination programs in the UK and several other countries [2,3]. In the United States, Pfizer-BioNTech, Moderna, and Janssen Covid-19 vaccines have been granted Emergency Use Authorization (EUA) for prevention of Covid-19 [4,5]. They are all effective at preventing and reducing the risk of different variants of Covid19 virus, especially the severe form of the disease [6,7]. They are also valuable and proven to be safe in the elderly, frail, immunosuppressed, and vulnerable nursing home populations [8-10].

The Pfizer/BioNTech vaccine has been authorized to be used in individuals 16 years old and older. It provides immunogenicity for at least 119 days after the first vaccination. A two-dose regimen of Pfizer/BioNTech vaccine had 95% efficacy (95% CI 90.3-97.6) in preventing symptomatic Covid-19 at or after day 7 following the second dose in placebo-controlled multinational trials. On August 23, 2021 the US food and drug administration approved the first Covid-19 vaccine, which is Pfizer/BioNTech. Mass roll-out of the first doses of the Pfizer/ BioNTech and Oxford-AstraZeneca vaccines was associated with substantial reductions in the risk of hospital admission due to Covid-19 in Scotland. In prospective cohort study, the first dose of the Pfizer/ BioNTech vaccine was associated with a vaccine effect of 91% (95% CI 85-94) for reduced Covid-19 hospital admission at 28-34 days post-vaccination. Vaccine effect at the same time interval for the Oxford -AstraZeneca vaccine was 88% (95% CI 75-94)

### The Effect of Single vs. Two Vaccine Shots

Yeast In the current study, we found that even a single vaccine dose is effective in preventing severe Covid-19 infection related consequences, the adjusted odds ratio of death in the vaccinated group was 0.39 (CI is 0.15 to 0.93). The percentages of survival after single and two doses were 88% (73 out of 83 patients), and 80% (12 out of 15 patients), respectively. Of note, the majority of those who received 2 doses were diabetic, elderly, and renal transplant groups. A case-control study conducted in England analyzed 156,930 adults aged 70 years and older, showed that the BNT162b2 vaccine effects after the first dose, reached 70% (95%CI 59% to 78%), after the second dose a vaccination effectiveness of 89% (85% to 93%). For the Oxford-AstraZeneca vaccine, effects were seen from 14 to 20 days after vaccination, reaching an effectiveness of 60% (41% to 73%) from 28 to 34 days increasing to 73% (27% to 90%) from day 35 onwards. Another case-control study done in Qatar showed that the effect was negligible in the first 2 weeks after the first dose. It increased to 36.8% (95% CI, 33.2 to 40.2) in the third week after the first dose and reached its peak at 77.5% (95% CI, 76.4 to 78.6) after the second dose.

### Effect of Covid-19 Vaccine on Old Patients

The risk of severe Covid-19 illness increases with age; this is why the CDC recommends that adults older than 65 years have the priority for receiving Covid-19 vaccines. In our analysis, out of 260, only 51 (20%) patients aged 65 years and older were admitted with Covid-19 infection. 64.7% (n=33) of them were unvaccinated, death reported to be 54.55% (n=18) in this group. The vaccinated group contained 18 patients with a mortality of 33.33% (n=6). This analysis found that the Covid-19 vaccines are effective against hospital admission of Covid-19 in older patients and against death. This result is consistent with many studies; one project assessed BNT162b2 vaccine effectiveness in elderly patients, recruited 7280 Covid-19 patients (5451 (75%) were unvaccinated, 394 (5%) were fully vaccinated, and 867 (12%) were partially vaccinated). The vaccine effectiveness in patients aged 65-74 years was estimated to be 96% (95% CI=94%-98%) and 84% (95% CI=76%-89%), respectively. The efficacy in those aged  $\geq 75$  years was noted to be lower; 91% (95% CI=87%-94%) and 66% (95% CI=48%-77%) following full and partial vaccination, respectively. This proves the high efficacy of full as well as partial vaccination in preventing hospitalization in the old population.

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