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COVID–19 mRNA vaccine effectiveness in hospitalised adults during 2020 – 2022: a test – negative case – control study

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Background

- Coronavirus disease 2019 (COVID-19) – pandemic that led to increased morbidity and mortality worldwide.
- Vaccines were developed to control the pandemic.
- Lower vaccine effectiveness (VE) was found in older people and people with comorbidities.
- It is crucial to monitor VE in different patient groups – timely COVID-19 prevention and control policies can be implemented.
- The aim: to assess VE of two and three doses of mRNA vaccines in hospitalised adults due to severe acute respiratory infection (SARI) from December 2020 to July 2022.

Methods

- A test-negative case-control study.
- Fully vaccinated person is an individual vaccinated with two mRNA vaccine doses at least 14 days before the SARI onset.
- Vaccinated with three doses (fully vaccinated individuals who received a booster) – analysed separately.
- Unvaccinated individuals – not a single dose of the COVID-19 vaccine received.
- Two- and three-dose VE and thier 95% confidence intervals (95% CI) were calculated as (1-odds ratio)*100%.
- The analysis was stratified by age (18–64 vs ≥65 years), and adjusted for potential confounders that changed the unadjusted VE by ≥10%.

Results

- Total number of recruited participants was 208, of which 129/208 (62%) were SARS-CoV-2 positive.
- 39/208 (18.75%) and 26/208 (12.5%) were vaccinated for COVID-19 with two- and three- mRNA vaccine doses, respectively.

Demografic and clinical characteristics of fully vaccinated individuals

	SARS-CoV-2 possitive N=124 (68.1%)	SARS-CoV-2 negative N=58 (31.9%)	p - value
Sex: female	45 (36.3)	26 (44.8)	0.271[a]
Age: median (Q1; Q3)	58 (48.0; 64.0)	71 (58.8; 78.5)	0.001[b]
Age ≥ 65 y. o.	27 (21.8)	37 (63.8)	<0.001[a]
Fully vaccinated	9 (7.3)	30 (51.7)	<0.001[a]
Current smoker	9 (10.2)	16 (27.6)	0.006[a]
At least one underlying condition	88 (71.0)	50 (86.2)	0.025[a]
Obese	47 (48.0)	20 (35.1)	0.119[a]

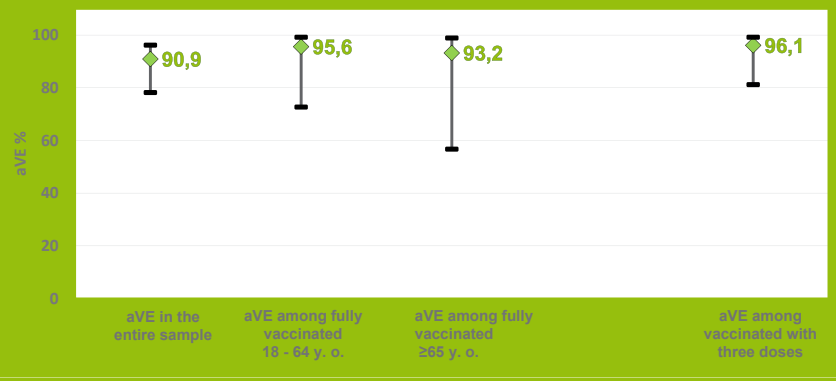
[a]Pearson Chi-Square test; [b]Mann-Whitney test

Demografic and clinical characteristics of those vaccinated with three doses

	SARS-CoV-2 possitive N= 120 (71.0%)	SARS-CoV-2 negative N=49 (29.0%)	p - value
Sex: female	40 (33.3)	22 (44.9)	0.157[a]
Age: median (Q1; Q3)	58 (48.0; 64.0)	72 (57.0; 81.0)	0.001[b]
Age ≥ 65 y. o.	27 (22.5)	29 (59.2)	<0.001[a]
Vaccinated with three doses	5 (4.2)	21 (42.9)	<0.001[a]
Current smoker	9 (10.7)	17 (34.7)	<0.001[a]
At least one underlying condition	85 (70.8)	44 (89.8)	0.009[a]
Obese	46 (49.5)	15 (31.3)	0.039[a]

[a]Pearson Chi-Square test; [b]Mann-Whitney test

Adjusted vaccine effectiveness in different groups



Conclusions

- Full vaccination with two mRNA vaccines showed high VE against laboratory-confirmed SARS-CoV-2 in hospitalized adults in all age groups.
- Slightly higher VE was found in those vaccinated with three mRNA vaccine doses.
- Further analysis will explore VE for preventing COVID-19 among adults hospitalized due to SARI when vaccinated with combinations of different vaccines, and during different phases of the COVID-19 pandemic defined by the predominant SARS-CoV-2 strain.

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