Effectiveness of COVID-19 Vaccines in Colombia: Findings from Two Highly **Specialized Healthcare Centers**

Cortes Luna JA¹, Paternina-Caicedo A², Moyano Tamara L³, Navarro R⁴, Alvis Zakzuk NR³, Alvis Guzmán N^{5,} De la Hoz Restrepo F⁶ 1. Universidad Nacional/Hospital Universitario Nacional, Bogotá, Cundinamarca, Colombia; 2. ALZAK Foundation- Universidad del Sinú, Cartagena, Bolívar, Colombia; 3 ALZAK, Cartagena, Bolívar, Colombia, 4. Gestión Salud IPS, Cartagena, Bolívar, Colombia; 5. Universidad de la Costa, Barranquilla, Atlántico, Colombia; 6. Universidad Nacional de Colombia, Bogotá,, Colombia.

OBJECTIVE

We aimed to assess the effectiveness of COVID-19 preventing vaccines in laboratory confirmed COVID-19 hospitalizations and deaths among individuals aged 18 years

and older in Colombia.

METHODS

A case-control study was conducted utilizing two control groups: 1) Individuals like symptoms plus with COVID-19 negative COVID-19 tests. 2) Individuals with no COVID-19 like symptoms. Cases were defined as any person with COVID-19 like symptoms plus a COVID-19 test positive (PCR or rapid test). Cases and controls were obtained from two health centers: the National University Hospital (HUN) and Gestión Salud IPS. Clinical data were obtained from medical records between January 2021 and June 2022 and vaccination information was obtained from PAIWEB.

A total of 705 patients were enrolled in the study, consisting of 197 cases and 508 controls. Among the cases, 137 (69.5%) were unvaccinated, compared to 406 (79.9%) in the control group (**Table 1**).

Differed from the distribution of controls in sex (P=0.006), presence of cough (P=0.003), and fatigue (P<0.001) was observed (**Table 1**).

Table 1. Cases-controls characteristics and **COVID** vaccination schedules

	Controls	Cases	P-value
Characteristics	n = 508	n = 197	
Age in years; mean (min - max)	59.0 (46.0-69.0)	59.0 (46.0-70.0)	0.700
Sex; n(%)			0.006
Female	214 (42.1)	60 (30.5)	
Male	294 (57.9)	137 (69.5)	
Death; n(%)	150 (29.5)	67 (34.0)	0.286
Most prevalent symptoms at hospital admision; n(%)			
Cough	352 (69.3)	159 (80.7)	0.003
Fever	301 (59.3)	109 (55.3)	0.389
Shortness of breath	346 (68.1)	154 (78.2)	0.011
Fatigue	243 (47.8)	124 (62.9)	< 0.001
Most prevalent comorbility; n(%)			
Cardiovascular deseases	218 (42.9)	85 (43.1)	1.000
Endocrine disease	98 (19.3)	46 (23.4)	0.273
Kidney diseases	57 (11.2)	23 (11.7)	0.969
Obesity	48 (9.4)	25 (12.7)	0.259
Vaccination schedule; n(%)			
Not vaccinated	406 (79.9)	137 (69.5)	
No-mRNA(1) & No-mRNA(2) & No-mRNA(3) (≥14 d)	0 (0.0)	1 (0.5)	
No-mRNA(1) & No-mRNA(2) & mRNA(3) (≥14 d)	0 (0.0)	2 (1.0)	
No-mRNA(1) & No-mRNA(2) (≥14 d)	40 (7.9)	25 (12.7)	
No-mRNA(1) (0-13 d)	7 (1.4)	5 (2.5)	
No-mRNA(1) (≥14 d)	36 (7.1)	14 (7.1)	
mRNA(1) & mRNA(2) (≥14 d)	11 (2.2)	9 (4.6)	
mRNA(1) (0-13 d)	1 (0.2)	1 (0.5)	
mRNA(1) (≥14 d)	7 (1.4)	3 (1.5)	

RESULTS

Primary doses of mRNA vaccines were most administered (4.6% in cases and 2.2% in controls). The adjusted analysis revealed that the effectiveness of the second dose of mRNA vaccines was 14% (95% CI: 162 to 72) (**Table 2**).

Table 2. Effectiveness of COVID-19 vaccination schedules in Colombia.

Vaccination schedules

 $mRNA(1) \& mRNA(2) (\geq 14 d)$ mRNA(1) (≥14 d) No-mRNA(1) & No-mRNA(2) (\geq 14 d) No-mRNA(1) (≥14 d)

CONCLUSIONS

Due to the limited sample size, the study lacked adequate statistical power to identify significant differences in vaccine effectiveness against COVID-19. Therefore, it is recommended to conduct further research studies with larger sample sizes.





	Odds Ratio (95% CI)			
	Unadjusted	Adjusted		
	2.42 (0.98 to 5.98)	0.86 (0.28 to 2.62)		
	1.27 (0.32 to 4.98)	1.32 (0.30 to 5.85)		
)	1.85 (1.08 to 3.17)	1.43 (0.68 to 2.98)		
	1.15 (0.60 to 2.20)	1.00 (0.47 to 2.11)		