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The Relationship between D-dimer and Vaccination of COVID-19

Nawal S. Faris*

*Faculty member at Zarqa University, Jordan

RESEARCH ARTICLE

ABSTRACT

COVID - 19 viruses are responsible for endemic respiratory tract infection in the wide world. Following vaccination with the nCoV-19 vaccine, however, cases of thrombosis and thrombocytopenia, to detect these cases D-dimer test should be done therefore, this study aims to detect the relation between D- dimer and vaccination of COVID19. This study that done by vaccinated patients from the special labs in Amman the capital of Jordan between January 2022 to October 2022 using PCR tests for detecting the virus. XL-FDP level estimated by using Atlas D-Dimer Latex Kit (Atlas Medical, Cowley Rd, Cambridge) following manufacturing instruction. We conclude that the vaccinated COVID-19 patients suffer from elevated baseline D-dimer. Thrombosis can occur in different organs, leading to organ failure in serious COVID-19 cases.

KEYWORDS

COVID-19, COVID-19 vaccines, D-dimer, Vaccine

Correspondence to: Dr. Nawal S. Faris, Faculty member at Zarqa University, Jordan, Email: Nawal_fares94@hotmail.com

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INTRODUCTION

COVIDs are enveloped, positive-sense, and single-stranded RNA viruses. COVID-19 is causing devastating morbidity and mortality in people all over the world [1]. The COVID-19 infections, the predominant respiratory tract infection in the population which reach 178 million cases in the wide world and the mortality 3, 86 million [2]. About 20 % of infected patients have a severe form of the disease, including acute respiratory distress syndrome and bilateral pneumonia [2]. Patients with extreme COVID-19 symptoms have a profound coagulopathy, with thromboembolic complications affecting about 30 % of patients, increase of neutrophil seen in extreme COVID-19 patients plays a role in inflammation-related coagulation. Bacterial infection occurs as a complication of viral infection which leads to activation of neutrophils, increased phagocytic potential, and produce cytokines like IL-6, TNF-level, especially for CD40 [2].

Which is clinically linked to D-dimer [3] mainly in acute and chronic inflammation, serum ferritin is increased. Therefore, ferritin should be detected in COViD-19 infection. Since ferritin use as a marker for immune dis regulation which leads to immune suppression [4].

Many studies done to detect if the vaccine can cause a high coagulation risk as a side effect of this vaccines but until now this does not identify because there are many factors related with this risk, one of the factors that can cause unclear information is type of vaccine an addition age of patient [5].

MATERIALS AND METHODS

One hundred random patients visited special labs from January 2022 to October 2022. Blood was taken from the vein using a 5 ml plastic syringe. The blood was placed in sterile plastic tubes with sodium citrate as anticoagulant (blue cap), then plasma separation by centrifuged at 1500 rpm for 15 minutes. The (XL-FDP) was measured directly in vitro. Demographics information was taken by the receptionist of the medical lab. The vaccination type was taken by Sanad Jo program. XL-FDP level estimated by using Atlas

D-Dimer Latex Kit (Atlas Medical, Cowley Rd, Cambridge) Following manufacturing instruction.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Ethical committee of the institute and informed consent was obtained from patients. Approval attached

RESULTS

		Distribution	D-dimer and vaccine		Dose of vaccine			Type of vaccine		
			Positive	Negative	First	Second	Third	Pfizer	Sino pharm	Astra Zeneca
Vaccinated	Frequency	72	9	63	12	57	3	45	24	3
	%	60	7.5	52.5	10	47.5	2.5	37.5	20	2.5
Non-vaccinated	Frequency	48	12	36						
	%	40	10	30						

Table 1: The frequency and percent of vaccinated and non-vaccinated.

Patient Number	D-dimer	Age	Gender
1	0.38	42	M
2	3.02	70	F
3	1.49	50	F
4	0.62	60	M
5	0.47	47	M
6	0.35	59	F
7	1.8	70	M
8	1.72	66	F
9	2.47	47	F
10	0.86	40	M
11	0.7	60	F
12	0.55	41	F
13	2.52	61	M
14	7.01	66	M
15	1.39	60	M
16	1.42	50	F
17	0.92	62	M
18	1.82	50	F
19	1.40	42	F

20	3.20	70	F
21	2.1	71	M
22	14.7	60	F
23	7.94	61	M
24	1.5	41	M
25	0.6	30	F
26	11.2	63	M
27	2.6	55	M
28	5.3	39	F
29	0.73	44	M
30	0.44	52	F
31	0.34	44	F
32	1.17	52	M
33	1.03	56	M
34	0.91	40	F
35	0.45	41	F
36	0.57	44	M
37	1.45	43	F
38	1.68	50	M
39	0.92	47	M
40	0.86	60	F
41	3.01	55	M
42	1.80	62	F
43	0.7	41	M
44	2.7	40	M
45	1.17	66	F
46	0.46	40	F
47	0.58	46	F
48	6.4	58	M
49	0.75	37	M
50	2.7	66	M
51	0.28	41	F
52	0.29	53	F
53	0.68	35	F
54	1.44	51	F
55	1	70	M
56	9.22	71	F
57	0.55	49	F
58	3.22	76	M
59	1.52	83	M
60	2.44	50	M
61	2.24	60	M
62	1.67	80	F
63	0.34	44	M
64	0.58	70	F
65	1.63	56	M
66	0.36	43	M
67	0.52	33	M
68	1.04	56	F

69	2.55	65	F
70	0.7	37	M
71	5.35	60	M
72	0.6	56	M
73	0.34	62	F
74	0.98	40	M
75	0.42	66	F
76	1.25	70	M
77	0.33	43	M
78	1.44	50	F
79	1	78	M
80	1.71	65	F
81	0.5	33	M
82	1.25	56	F
83	2.58	55	M
84	14.6	56	M
85	0.9	44	M
86	5.77	60	F
87	0.6	40	M
88	6.4	44	F
89	0.9	42	M
90	3.01	44	F
91	0.68	50	M
92	2.88	65	F
93	2.7	45	M
94	0.8	43	M
95	2.65	37	F
96	1.44	55	M
97	6.3	71	F
98	1.8	48	M
99 1001.7055M	0.75	55	F

Table 2: The relationship between D-dimer and vaccination of COVID-19.

Gender	Number n=100	Average age	Average d. d
Male	52	54.77	2.32
Female	48	52.52	1.89

Table 3: Gender classification ratio among the patients.

Characteristics	Pfizer (n=95)	Sino pharm (n =96)	Astra Zeneca (n = 91)	Total (n=300)	p-Value
Age 20–40 Y	20	24	22	66	0.673
40–60 Y	44	41	38	123	
>60 Y	47	34	30	111	
Gender					0.54
Male	61	56	49	166	
Female	52	46	36	134	
D-dimer	35	45	20	100	0.2

Table 4: Distribution of the patient's drug intake according to demographic details.

DISCUSSION

Patient with COVID-19 suffers from severe infection lead pneumonia and hypoxia [6]. Increase D-dimer level indicating hyper coagulation factors. Hypercoagulability may be linked to a cytokine storm that causes endothelial damage and micro vascular thrombosis. An elevation of D-dimer is linked to a higher mortality rate [7].

Results showed that the Vaccinated persons frequency of the current study were (60 %) while the non-vaccinated persons were (40 %). On the other hand, the frequency of vaccinated persons with negative D. dimer test (52.5 %) showed the higher frequency than vaccinated persons with positive D. dimer test (7.5 %). an addition the frequency of non-vaccinated persons with positive D. dimer (10 %) showed lower frequency than negative D. dimer test (30 %). Most vaccinated persons took the second dose of vaccine (47.5 %), and the most used type of vaccine was Pfizer (37.5 %).

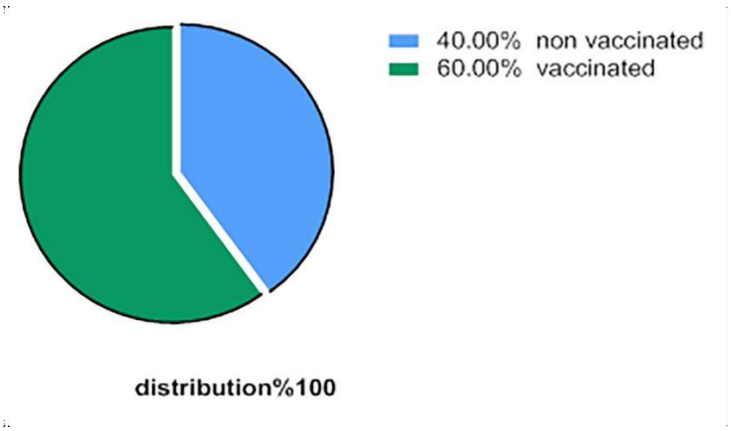

Figure 1: Vaccinated persons frequency of the current study.

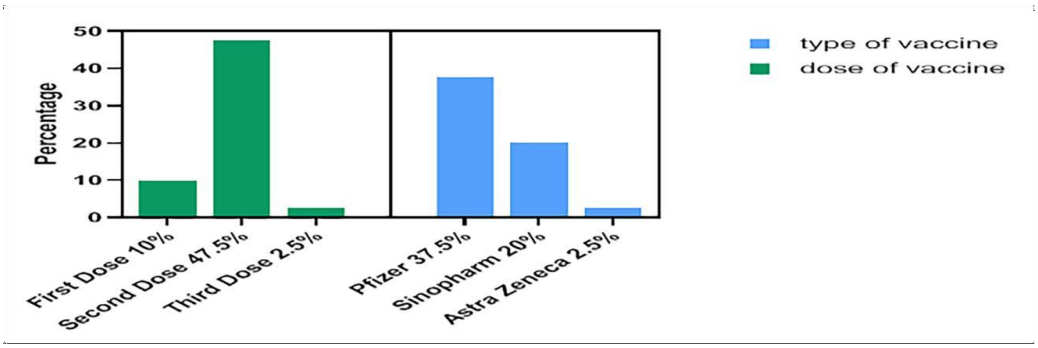

Figure 2: Different doses an type of vaccines.

In COVID-19 patients, elevated baseline D-dimer levels are linked to Vaccinated persons, Anticoagulant therapy may be needed due to abnormal D-dimer. And the recommendations are to use anticoagulant and anti-inflammatory medications to control these cases.

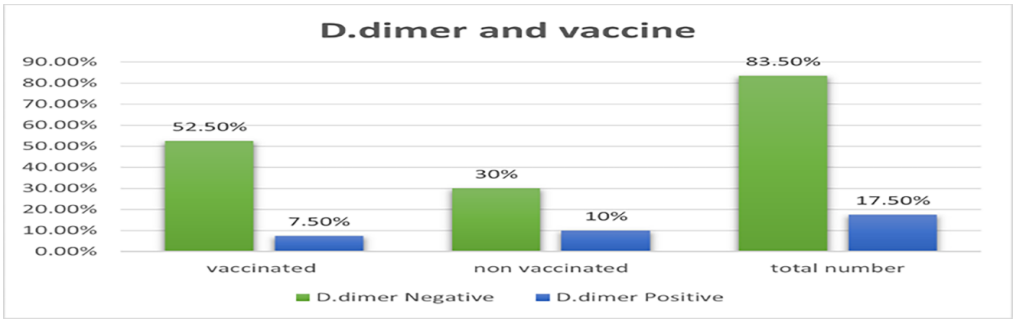

Figure 3: Elevated baseline D-dimer levels.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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