Journal for Research in Applied Sciences and Biotechnology

www.jrasb.com

ISSN: 2583-4053

Volume-2 Issue-5 || October 2023 || PP. 205-209

https://doi.org/10.55544/jrasb.2.5.30

Impact of Covid-19 Vaccine on Male Seminal Fluid Paramerters

Abdulrahman Mahdi saleh[1], Ula Al-Kawaz[2] and Amal Abdulwahid[3]

[1]Al-Nahrain University, High Institute of Infertility Diagnosis an Assisted Reproductive Technology, IRAQ.

[2]Al-Nahrain University, High Institute of Infertility Diagnosis an Assisted Reproductive Technology, IRAQ.

[3]Al-Nahrain University, High Institute of Infertility Diagnosis an Assisted Reproductive Technology, IRAQ.

[1]Corresponding Author: abdulrahman.mahdi12@gmail.com

www.jrasb.com || Vol. 2 No. 5 (2023): October Issue

Received: 28-10-2023	**Revised:** 15-11-2023	**Accepted:** 20-11-2023

ABSTRACT

This study was specifically designed to investigate the potential negative impact of COVID-19 vaccination on semen parameters (SFA) in a cohort of fertile men.

Methods: 93 fertile vaccinated with2 doses of different covid19 vaccine (Pfizer, astrazenica, and sinopharm). The comparison of seminal fluid analysis parameters pre and post vaccination is the axis of study.

Results: sperm concentration was statistically significant (main changes in Pfizer group). insignificant difference to other semen parameter.

Conclusion: COVID-19 vaccine not impact semen fluid analysis parameters. So, most be not withheld men desiring fertility who meet criteria for vaccination.

Keywords- COVID-19 vaccine, Male Seminal, fertile men, Pfizer, astrazenica, and Sinopharm.

I. INTRODUCTION

Male infertility is frequently caused by problems of sperm production or impaired sperm quality, seminal fluid analysis (SFA) is used as a surrogate measure to evaluate male fecundity(Pozzi et al., 2021).

COVID-19 pandemic become a global hazard to public health. Men were more severely harmed than women due to sex factor differences, may be because females had a stronger innate immune response than males. (Sheikhzadeh Hesari et al., 2021). Many type of COVID-19 vaccines designed to direct immune system to safely recognize and block the virus that causes COVID-19. Three main kinds vaccine available in Iraq are:- Pfizer/BioNTech which (DNA/RNA)Gene Vaccine(Tombacz et al., 2021), AZD1222-Oxford/AstraZeneca(Viral Vector Vaccines) (Baldo et al., 2021) and BBIBP-CorV-Sinopharm(Whole Virus Vaccines.(Ma et al., 2021)). it important to determine acceptance that associated with vaccine in relation to semen parameter.

II. PATIENTS, MATERIALS AND METHODS

From the High Institute of Infertility Diagnosis and Assisted Reproductive Technologies a prospective cohort study conducted between September 1, 2021, and April 1, 2022

2.1 Patients Selection

93 healthy fertile males, age between 20 to 50 years, a written consent was obtained from each one.

2.2 Materials

History, examination and semen sample taken before vaccination, and (3-4 month) later 2nd SFA done to be examine under light microscope.

III. RESULT

93 participants were involved in comparative cross-sectional study, illustrated by Figure 4-1. SFA parameters of all men were compared between AstraZeneca, Pfizer and Sinopharm vaccine groups.

Journal for Research in Applied Sciences and Biotechnology

www.jrasb.com

ISSN: 2583-4053

Volume-2 Issue-5 || October 2023 || PP. 168-167

https://doi.org/10.55544/jrasb.2.5.26

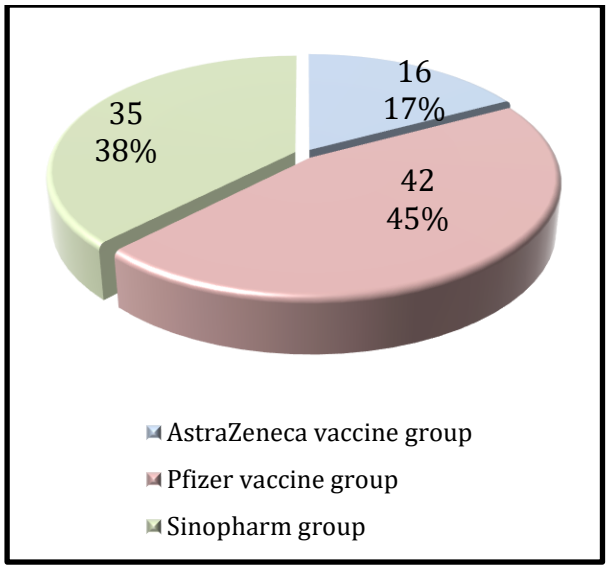

Figure 4.1: Classifications of the studied groups

Comparison of seminal fluid analysis parameters between the three studied groups

The comparison of seminal fluid analysis parameters were demonstrated in table 4-1, according to the results there was no significant difference between the three studied groups regarding seminal fluid volume (p=0.501), sperm concentration (p=0.115), total sperm counts (p=0.297), progressively motile sperm (p=421), non- progressively motile sperm (p=0.925), immotile sperm (p=0.506), morphologically normal sperm (p=0.174) and round cell count (p=0.333).

Table 4.1: Comparison of seminal fluid analysis parameters between the three studied groups before vaccination

Parameters	AstraZeneca vaccination group	Pfizer Vaccination group	Sinopharm Vaccination group	*p* value
Volume (cm³)	2.61 ± 0.15	2.58 ± 0.13	2.78 ± 0.13	0.501 ∀ NS
Sperm concentration (x10⁶/ml)	32.56 ± 4.29	23.87 ± 2.69	22.93 ± 2.49	0.115 ∀ NS
Total sperm counts (x10⁶)	90.81 ± 15.54	63.53 ± 8.60	66.47 ± 11.48	0.297 ∀ NS
Progressive motile sperm %	33.69 ± 3.06	34.31 ± 1.73	35.23 ± 2.59	0.421 ∀ NS
Non progressively motile %	11.81 ± 1.57	10.88 ± 1.38	11.34 ± 1.43	0.925 ∀ NS
Immotile sperm %	54.50 ± 3.52	57.57 ± 1.58	54.57 ± 2.34	0.506 ∀ NS
Morphologically normal sperm %	46.58 ± 6.30	38.29 ± 2.92	35.57 ± 2.83	0.174 ∀ NS
Round cells 5	1.49 ± 0.47	3.59 ± 0.80	3.26 ± 0.33	0.333 ∀ NS

SD: Standard deviation; NS: Not significant (p > 0.05); ∀: ANOVA test.

4.2.2. Comparison of seminal fluid analysis parameters before & after AstraZeneca vaccination

There significant differences in seminal fluid volume (p=0.024) and progressively motile sperm percent (p=0.008) after vaccine only. Showed in table 4.2

Table 4.2: Comparison of seminal fluid analysis parameters pre and post AstraZeneca vaccination

Parameters		Before vaccination (Mean ± SD)	After vaccination (Mean ± SD)	*p* value
Volume (cm³)		2.61 ± 0.15	3.10 ± 0.12	0.024 Ŧ S
Sperm concentration (x10⁶/ml)		32.56 ± 4.29	30.66 ± 4.14	0.640 Ŧ
Total sperm counts (x10⁶)		90.81 ± 15.54	93.59 ± 13.11	0.850 Ŧ NS
Sperm motility%	Progressive motile	33.69 ± 3.06	42.75 ± 3.27	0.008 Ŧ S
	Non progressively motile %	11.81 ± 1.57	11.06 ± 1.87	0.704 Ŧ NS
	Immotile sperm %	54.50 ± 3.52	49.94 ± 4.59	0.341 Ŧ NS
Morphologically normal sperm %		46.58 ± 6.30	55.56 ± 6.39	0.059 Ŧ
Round cells		1.49 ± 0.47	3.31 ± 1.15	0.179 Ŧ

SD: Standard deviation; NS: Not significant (p > 0.05); S: Significant (p ≤ 0.05); Ŧ: Paired sample t -test.

4.2.3. Comparison of seminal fluid analysis parameters before & after Pfizer vaccination

From table 4-3 significant difference (p≤ 0.05) sperm concentration, total sperm count, percentage of progressively motile, immotile sperm and morphologically normal sperm.

Table 4.3: Comparison of seminal fluid analysis parameters pre and post Pfizer vaccination

Parameters	Before vaccination (Mean ± SD)	After vaccination (Mean ± SD)	*p* value

ISSN: 2583-4053

Volume-2 Issue-5 || October 2023 || PP. 168-167

https://doi.org/10.55544/jrasb.2.5.26

Volume (cm³)		2.58 ± 0.10	2.62 ± 0.15	0.836 Ŧ NS
Sperm concentration (x10⁶/ml)		23.87 ± 2.69	41.88 ± 3.61	< 0.001 Ŧ
Total sperm counts (x10⁶)		63.53 ± 8.60	111.08 ± 13.88	0.001 S
Sperm motility%	Progressive motile	34.31 ± 1.73	37.88 ± 2.11	0.011Ŧ S
	Non progressively motile %	10.88 ± 1.38	11.00 ± 1.05	0.932 Ŧ NS
	Immotile sperm %	57.57 ± 1.58	49.81 ± 2.14	0.004Ŧ S
Morphologically normal sperm %		38.29 ± 2.92	49.55 ± 2.79	< 0.001 Ŧ
Round cells		3.59 ± 0.80	4.72 ± 0.73	0.062 Ŧ

SD: Standard deviation; NS: Not significant ($p \geq 0.05$) ;S: Significant ($p < 0.05$) ; Ŧ: Paired sample t -test.

4.2.4. Comparison of seminal fluid analysis parameters before & after Sinopharm vaccination

Table 4-4 demonstrated significant differences ($p \leq 0.05$) and improvements in sperm concentration, progressive motility, immotile sperm and normal morphology sperm percentages.

Table 4.4: Comparison of seminal fluid analysis parameters pre and post Sinopharm vaccination

Parameters		Before vaccination (Mean ± SD)	After vaccination (Mean ± SD)	*p* value
Volume (cm³)		2.78 ± 0.13	2.65 ± 0.18	0.562 Ŧ NS
Sperm concentration (x10⁶/ml)		22.93 ± 2.49	35.70 ± 3.57	0.001 Ŧ S
Total sperm counts (x10⁶)		66.47 ± 11.48	88.72 ± 9.78	0.067 NS
Sperm motility%	Progressive motile	35.23 ± 2.59	43.43 ± 2.16	0.014Ŧ S
	Non progressively motile %	11.34 ± 1.43	10.91 ± 1.23	0.815 Ŧ NS
	Immotile sperm %	54.57 ± 2.34	45.66 ± 2.79	0.012Ŧ S
Morphologically normal sperm %		35.57 ± 2.83	45.14 ± 3.09	0.002 Ŧ
Round cells		3.26 ± 0.33	4.57 ± 0.67	0.066 Ŧ

SD: Standard deviation; NS: Not significant ($p > 0.05$); S: Significant ($p \leq 0.05$); Ŧ: Paired sample t -test.

Repeated measured ANOVA to evaluate the SFA between the three studied groups, just sperm concentration was statistically significant (p=0.006) with major difference presented in Pfizer group, other parameters no significant differences, meaning statistically insignificant difference between second and first readings regarding total sperm count, types of sperm motility, morphology and round cell counts as illustrated in table 4-5.

Table 4.5: Repeated measures ANOVA for comparison of seminal fluid analysis parameters pre and post vaccination in the three studied groups

Parameters	AstraZeneca Vaccine group	Pfizer Vaccine group	Sinopharm Vaccine group	*p* value
Seminal fluid volume (cm³)				
Before vaccination	2.61 ± 0.15	2.58 ± 0.13	2.78 ± 0.13	0.240 NS
After vaccination	3.10 ± 0.12	2.62 ± 0.15	2.64 ± 0.18	
Sperm concentration (x10⁶/ml)				
Before vaccination	32.56 ± 4.29	23.87 ± 2.69	22.93 ± 2.49	0.006 S
After vaccination	30.66 ± 4.14	41.88 ± 3.61	35.70 ± 3.57	
Total sperm counts (x10⁶)				
Before vaccination	90.81± 15.54	63.53 ± 8.60	66.47 ± 11.48	0.109 NS
After vaccination	93.59 ± 13.11	111.08 ± 13.88	88.72 ± 9.78	
Progressively motile sperm %				
Before vaccination	33.69 ± 3.06	31.31 ± 1.73	35.23 ± 2.59	0.846 NS
After vaccination	42.75 ± 3.27	37.88 ± 2.11	43.43 ± 2.16	
Non-Progressively motile sperm %				
Before vaccination	11.81 ± 1.57	10.88 ± 1.38	11.34 ± 1.43	0.942 NS
After vaccination	11.06 ± 1.87	11.00 ± 1.05	10.91 ± 1.23	
Immotile sperm %				

ISSN: 2583-4053
Volume-2 Issue-5 || October 2023 || PP. 168-167
https://doi.org/10.55544/jrasb.2.5.26

Before vaccination	54.50 ± 3.52	57.57 ± 1.58	54.57 ± 2.34	0.730 NS
After vaccination	49.94 ± 4.59	49.81 ± 2.14	45.66 ± 2.79	
Morphologically normal sperm %				
Before vaccination	46.58 ± 6.30	38.29 ± 2.92	35.57 ± 2.83	0.879 NS
After vaccination	55.56 ± 6.39	49.55 ± 2.79	45.14 ± 3.09	
Round cell %				
Before vaccination	1.49 ± 0.47	3.59 ± 0.80	3.26 ± 0.33	0.994 NS
After vaccination	3.31 ± 1.15	4.72 ± 0.73	4.57 ± 0.67	

NS: Not significant ($p \geq 0.05$) ;S: Significant ($p < 0.05$)

IV. DISCUSSION

No statistically significant difference showed between the three groups in all SFA parameters within study.

Gonzalez et al. issued (within the spermatogenesis time frame up to 70 days before and after 2 doses of a COVID-19 mRNA vaccine, did not see a reduction semen values post COVID19 mRNA vaccine), result agree with this findings. (Gonzalez et al., 2021). Interestingly, the semen characteristics of the immunized men in this study showed a minimal improvement in volume, sperm concentration, and motility, no regression of any kind in semen characteristics post-vaccination. Minor progression of mean due to a small sample size misinforming increasing SFA parameters.

Also no obvious differences seen between the SFA parameters before and after vaccinations, according to a study by Olana et al. that included administrative and clinical hospital employees who got mRNA immunizations. (Olana et al., 2022)

Othe prospective study at the University of Miami were chosen for. Two mRNA vaccines, BNT162b2 (Pfizer-BioNTech) and 1273 (Moderna), It was reported that among this small cohort of healthy men before and after receiving two doses of the COVID-19 mRNA vaccine, there were no significant changes in any sperm parameter.)(Gonzalez et al., 2021).

4.1 Deferential Seminal fluid parameters before & after immunizations:

Within three group repeated measured ANOVA appraise just the sperm concentration was statistically significant, meaning there was a minimum or statistically insignificant difference between second and first readings. significant differences in sperm concentration may be attributed to

- interidividual variation in the abstinence duration (within the normal time limit) could be lead to the significant rise in sperm density.
- Regression to the mean is more sensitive in small sample sizes than in big samples because small sample size data have a greater influence on mean values.

-seasonal and diurnal variation effect on participant(winter and spring interval).

-Barda et al shows that the Pfizer, BNT162b, SARS-CoV-2 vaccine had no deleterious effect on sperm quality or any of the sperm parameters for both fresh and frozen, thawed samples. Semen quality improved after the second vaccine compared to samples before vaccination which agreed with our result study (Barda et al., 2022).Other international literature review Olana et al study, shows no significant differences in spermatozoa parameters before and after vaccine inoculations were be found.(Olana et al., 2022)

The result not agreed with Gat et al longitudinal study which published that systemic immune response after BNT162b2 vaccine is a reasonable cause for transient semen concentration and total motile count decline, but Long-term prognosis remains good This focused on SD demonstrates selective temporary sperm concentration and TMC deterioration 3 months after vaccination followed by later recovery verified by diverse statistical analyses. (Gat et al., 2022)

Lastly, Of clinical importance, at three tertiary referral centers in Italy found that COVID-19 vaccination had no impact on fertilization rate and sperm parameters. This was even true after considering different types of vaccines (mRNA or viral vector).(Reschini et al., 2022)

V. CONCLUSION

Result study were concerns for the effect of the vaccine on fertility showed that Seminal fluid parameters demonstrated out of seminal fluid density, no significant differences before and after immunization in the three studied groups of covid 19 vaccine.

REFERENCES

[1]Barda, S., Laskov, I., Grisaru, D., Lehavi, O., Kleiman, S., Wenkert, A., Azem, F., Hauser, R., & Michaan, N. (2022). The impact of COVID-19 vaccine on sperm quality. *International Journal of Gynecology & Obstetrics*.

[2]Pozzi, E., Boeri, L., Candela, L., Capogrosso, P., Cazzaniga, W., Fallara, G., Cignoli, D., Belladelli, F., Cornelius, J., & Abbate, C. (2021). Infertile couples still undergo assisted reproductive treatments without initial andrological evaluation in the real-life setting: A failure to adhere to guidelines? *Andrology*, *9*(6), 1843–1852.

[3]Sheikhzadeh Hesari, F., Hosseinzadeh, S. S., & Asl Monadi Sardroud, M. A. (2021). Review of COVID-19 and male genital tract. *Andrologia*, *53*(1), e13914.

[4]Barda, S., Laskov, I., Grisaru, D., Lehavi, O., Kleiman, S., Wenkert, A., Azem, F., Hauser, R., & Michaan, N.

ISSN: 2583-4053

Volume-2 Issue-5 || October 2023 || PP. 168-167

https://doi.org/10.55544/jrasb.2.5.26

(2022). The impact of COVID-19 vaccine on sperm quality. *International Journal of Gynecology & Obstetrics*.

[5]Pozzi, E., Boeri, L., Candela, L., Capogrosso, P., Cazzaniga, W., Fallara, G., Cignoli, D., Belladelli, F., Cornelius, J., & Abbate, C. (2021). Infertile couples still undergo assisted reproductive treatments without initial andrological evaluation in the real-life setting: A failure to adhere to guidelines? *Andrology*, *9*(6), 1843–1852.

[6]Sheikhzadeh Hesari, F., Hosseinzadeh, S. S., & Asl Monadi Sardroud, M. A. (2021). Review of COVID-19 and male genital tract. *Andrologia*, *53*(1), e13914.