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## **Acceptance rate, hesitancy and comorbidities in pregnant women: A COVID-19 vaccination status**

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**Abstract**--We analyzed the electronic data (e-data) of n=5231 vaccinated candidates including n=3671 males and n=1560 females. We studied the COVID-19 vaccine brands such as Sino pharm, CanSino, SinoVac, Moderna and Pfizer. We noted adverse effects in post-vaccinated candidates were Instability in blood pressure 29.5%, Swelling 3.5%, Redness 14.2%, Itching 7.13%, and Rashes 2.4%. Comorbidities in the vaccinated candidates such as Hypertension 33%, Diabetes mellitus 17%, Kidney disease 42%, and Chronic respiratory disease 9%. COVID-19 vaccine hesitancy 1153, 22% and Non-Hesitant 4078, 77%. We analyzed the e-data of COVID-19 vaccinated candidates, the acknowledgement of COVID-19 immunization in pregnant women. Worrying about vaccine safety was the significant justification for hesitancy. Recognizing mentalities among study groups will be valuable for coming up with vaccine strategies that increment the ongoing pandemic.

**Keywords**--Comorbidities, Hesitancy and Acceptance rate of COVID-19, Brand Preference, E-data.

**Introduction**

The coronavirus is a positive single-stranded RNA virus (+ssRNA) with a crown-like appearance (1). Viruses of the family Coronaviridae have been identified in, but not limited to mammals, including mice, dogs, bats, and cats. To date, several novel mammalian coronaviruses such as SARS (severe acute respiratory syndrome) and MERS (Middle East Respiratory Syndrome) are pathogenic to humans (2).

The first day before and the first few days after the start of symptoms see the highest viral loads in the upper respiratory tract. In the absence of containment measures, symptomatic patients represent the largest transmission potential with a risk of spreading the illness to others since coughing and sneezing increase the number of droplets that are ejected in the air or on surfaces (3).

Patients with COVID-19 have reported a wide range of clinical manifestations, such as chemosensory dysfunction, viral encephalitis, stroke, myocarditis, and cutaneous lesions, as well as symptoms and signs of neurological involvement

such as erythematous rash, and widespread urticaria. Most SARS-CoV-2 infected individuals suffer from mild to severe respiratory illnesses and bounce back without being admitted to the hospital. The most typical signs of disease are fever, cough, myalgia, exhaustion, and headache (4).

Challenges being faced to implement different programs against the SARS-COVID-19 vaccine includes the synthesis of vaccines, their distribution, and ambiguity in the long-term efficacy of the use of vaccines. But it has been found that the major factor that was responsible for the hurdles in controlling and reducing the negative consequences of the SARS-COVID-19 pandemic is vaccine hesitancy. Spreading awareness through different channels and programs, and making the public aware of the efficacy of the vaccines can help build trust in SARS-COVID-19 vaccination (5).

## **Methodology**

### **Study Design**

The study was conducted at multicenters of COVID-19 vaccination.

### **Analysis of candidate data**

We used e-data records of COVID-19 vaccination centers implemented by Primary Healthcare of Khyber Pakhtunkhwa, Pakistan under the permission and rights of the concerned body. We added the candidates n=5231 in a cross-sectional analytical study. Vaccinated candidates were organized by micro-plan of vaccines into several groups depending on age, sex, hesitancy, vaccine brands and vaccine doses.

### **Ethical approvals**

We submitted a research proposal to the concern organization of the COVID-19 vaccination centers to provide us with data access to the vaccine candidate. It will not be involved in violation, and never used the name or specific indications in the publication. The concerned officer permits us to direct the cross-sectional analytical study under the act and regulations of ethics.

### **Statistical significance**

The documented Data such as (Age, sex, educational status, COVID-19 vaccine brands and dosages, Comorbidities, and hesitancy Questions were interpreted through IBM SPSS 2.0. we used different types of analytical tests such as percentage, Mean and standard deviation, variance, and CI95% and one-way ANOVA test.

## **Results**

### **Sociodemographic**

We analyzed the electronic data (e-data) of n=5231 vaccinated candidates including n=3671 males and n=1560 females.

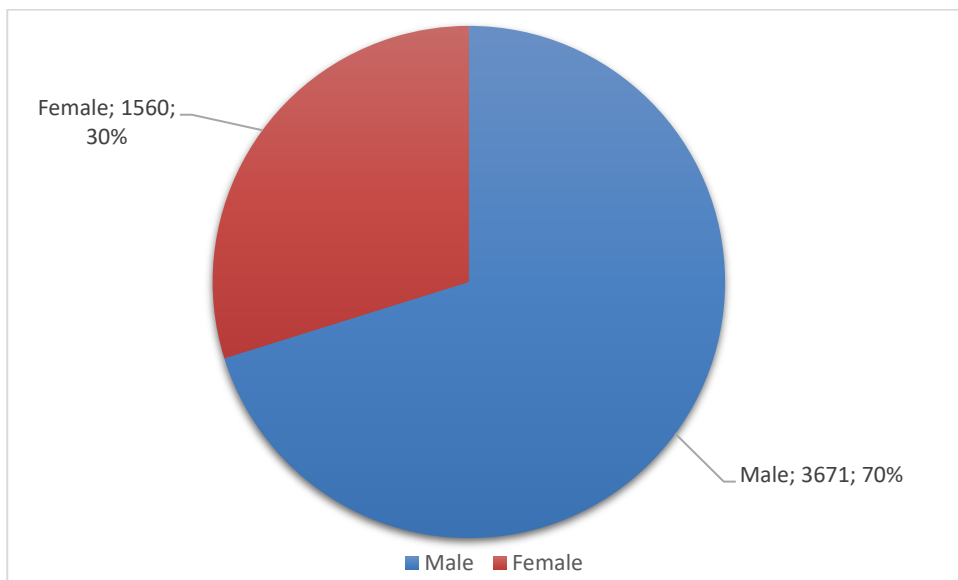


Figure 1: Registered genders for COVID-19 vaccination

### **Educational status**

We also analyzed the educational status of the vaccinated candidates so we recorded literate as 41%, above matric 36% and bachelors were 23%.

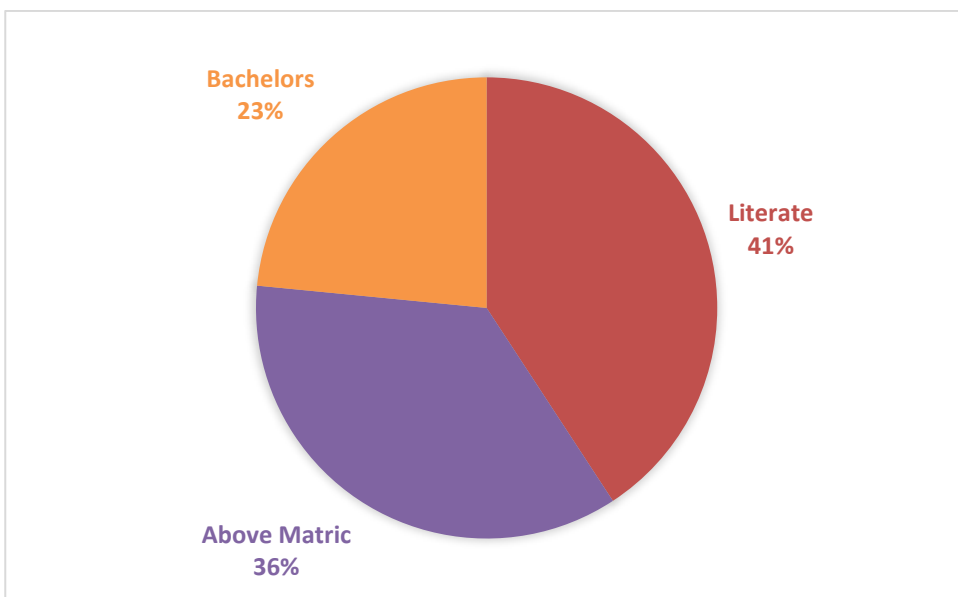


Figure 2: Educational status of vaccinated candidates

### Vaccinated Sex

We explored different age groups against vaccinated candidates such as 18 Years, 19-24 Years, 25-30 Years, 31-36 Years, 36-41 Years, 41-46 Years, and >46 Years. We divided the same group into two major sexes Males and Females.

Table 1: The Age categories (Male) of the vaccinated candidates

Sex	Age	<i>f</i>	%
Male	18 Years	1034	28.1
	19-24 Years	511	13.9
	25-30 Years	703	19.1
	31-36 Years	349	9.5
	36-41 Years	657	17.8
	41-46 Years	289	7.8
	>46 Years	128	3.4

\*Significant at <0.05

Table 2: The Age categories (Female) of the vaccinated candidates

Sex	Age	<i>f</i>	%
Female	18 Years	361	23.1
	19-24 Years	243	15.5
	25-30 Years	191	12.2
	31-36 Years	311	19.9
	36-41 Years	298	19.1
	41-46 Years	66	4.2
	>46 Years	90	5.7

### COVID-19 vaccination of candidates

We isolated the e data of different registered COVID-19 vaccine brands that were available in the vaccination stations and preferred by the candidates such as Sino pharm, CanSino, SinoVac, Moderna and Pfizer.

Table 3: The COVID-19 vaccine brands preferred by the candidates

Vaccine Types	(n= 5231) %	P-value
Sino pharm	57	0.02*
SinoVac	13	
CanSino	21	
Moderna	7	
Pfizer	2	

\*Significant at <0.05

Table 4: The COVID-19 vaccines doses administered by the candidates

Doses	(n=5231) %	P-value
Single Dose	100*	
Double Dose	83	
Booster	41	0.003*

\*Significant at <0.05

Table 5: Comparative analysis of COVID-19 vaccines doses &amp; brands by One-Way ANOVA

Variables	SS	df	MS	F-value	P-value
Between Vaccine Brand & Doses	1537.6	1	1537.6		
Within Vaccine brand & Doses	2002.8	8	250.35	F = 6.1418	0.382
Total	3540.4	9			

**SS (sum of squares deviation of data), df (Difference), MS (the mean sum of squares of data), and F (the F-statistic)**

#### Adverse effects of COVID-19 vaccines

We noted very rare post-vaccination adverse effects in candidates such as Instability in blood pressure, Swelling, Redness, Itching, and Rashes.

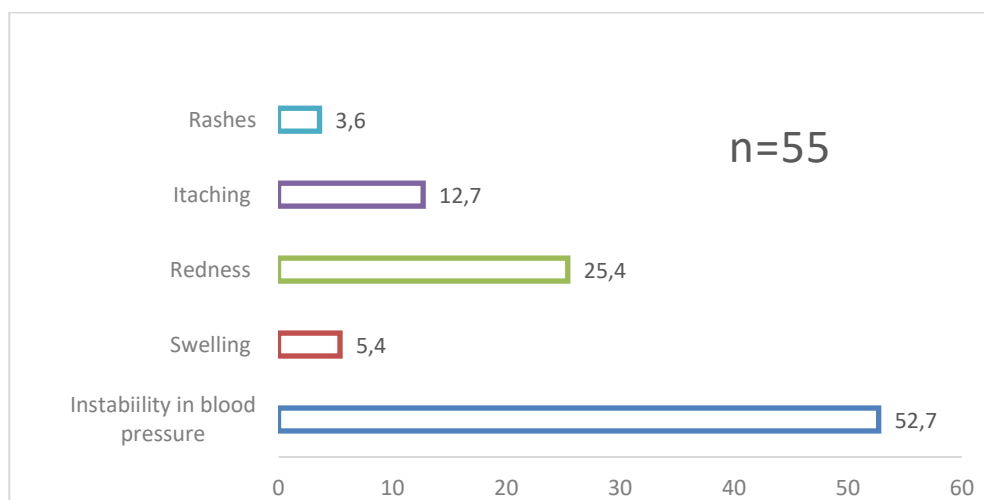


Figure 3: Post-COVID-19 vaccination adverse effects

#### Comorbidities

We documented different comorbidities in the vaccinated candidates such as Hypertension, Diabetes mellitus, Kidney disease, and Chronic respiratory disease.

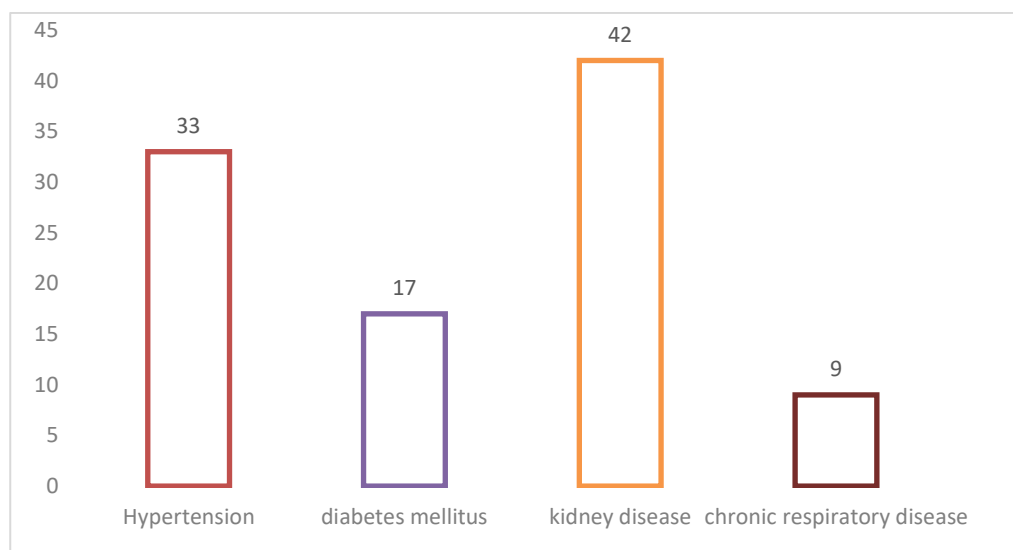


Figure 4: Comorbidities in the vaccinated candidate

### Hesitation of COVID-19 vaccines

We recorded the understanding of candidates against the COVID-19 vaccine hesitancy in which Hesitant were recorded at 1153, 22% and Non-Hesitant 4078, 77%.

Table 6: Questions answered by candidates for the hesitation of COVID-19 vaccines

Hesitancy Reason	(n=1153) %	P-value
Not Believe in COVID-19	27.7	0.0178*
Vaccine is safe?	64	
Do not Know about vaccine	21	
A vaccine is a good option	34.5	
Pregnancy	9.3	
Comorbidities	11	
on other vaccines	5.5	

\*Significant at <0.05

The hesitation of COVID-19 vaccines in Pregnant female

Table 7: Hesitancy of COVID-19 vaccines in pregnant females

Pregnancy Chart	n=145	8 weeks	10 weeks	12 weeks	15 weeks	22 weeks	28 weeks
1 <sup>st</sup> Trimester	31	9	4	18	0	0	0
2 <sup>nd</sup> Trimester	68	0	0	0	51	17	0
3 <sup>rd</sup> Trimester	46	0	0	0	0	0	46

Table 8: Comparative analysis of Trimester &amp; weeks by One-Way

Variables	SS	df	MS	F-value	P-value
Between the Trimester & weeks	115.4444	2	57.7222	F = 0.20896	0.8137
Within the Trimester & weeks	4143.5	15	276.2333		
Total	4258.9444	17			

**ANOVA**

**SS (sum of squares deviation of data), df (Difference), MS (the mean sum of squares of data), and F (the F-statistic)**

**Post Hoc Tukey Test**Table 9: Pairwise difference, comparison and hesitancy of COVID-19 vaccines on 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Trimester by Post Hoc Tukey HSD

Pairwise Comparison	HSD	Q	P=value	Alpha (Top)	Alpha (Bottom)
1 <sup>st</sup> Trimester=5.17 2 <sup>nd</sup> Trimester=11.33	6.17	0.91	0.799	.05 = 3.7729	Q.01 = 5.0459
1 <sup>st</sup> Trimester=5.17 3 <sup>rd</sup> Trimester=7.67	2.5	0.37	0.963		
2 <sup>nd</sup> Trimester=11.33 3 <sup>rd</sup> Trimester=7.67	3.67	0.54	0.923		

The standardized range statistic (q), the critical values for q corresponding to alpha = .05 (top) and alpha = .01 (bottom)

**Discussion**

It was found and reported from different surveys being done on age and sex, that the rate of acceptance of vaccines against COVID-19 in males was greater compared to females. This was all due to their strong perception related to the risks of COVID-19. These parameters should be taken into notice for determining the acceptance rate of COVID-19, as biasing in samples and even in sex distribution can affect the rates that were being reported.

Different surveys reported variable acceptance rates in different countries with East and South East Asia having high acceptance rates while Russia, Eastern Europe, and the Middle East have low acceptance rates against COVID-19 (6). Further studies are required to assess the response of public health in different areas of the globe so that these studies will help to determine the hesitancy in the case of COVID-19.

Challenges being faced to implement different programs against the COVID-19 vaccine includes the synthesis of vaccines, their distribution, and ambiguity in the long-term efficacy of the use of vaccines. But it has been found that the major factor that was responsible for the hurdles in controlling and reducing the negative consequences of the COVID-19 pandemic is vaccine hesitancy. Spreading awareness through different channels and programs, and making the public



aware of the efficacy of the vaccines can help build trust in COVID-19 vaccination (7).

According to the surveys being done on the acceptance of vaccines against COVID-19, it has been found that in South East Asia, the rate of acceptance of vaccines was relatively high. A study found that the acceptance rate was more than 90% in Malaysia, Indonesia, and China (8). In another survey, it has been found that the acceptance rate in South Korea was more than 80% (9). In a survey done by Zhang et al., it was reported that the people who were working in the factories found an acceptance rate of 72.5% which was less compared to the previous studies. In another survey done in Australia, it was found that the acceptance rate was 85.8% in adults when surveyed in April 2020. While this rate dropped to 75.8% when an online survey was conducted (10). The countries having a high rate of acceptance was all due to the strong government in those countries.

Vaccine hesitancy in case of COVID-19 can create hurdles in the efforts of controlling the pandemic, by affecting their social health too (11). Determine the immunity of the population for controlling the spread of the pathogen, this all depends on the reproductive number being linked with the infectious disease (12). Different surveys have been done to look for the hesitancy in the case of COVID-19 vaccines that are creating hurdles for controlling this pandemic.

A pregnant body has more requirements and faces less immune response as compared to normal bodies as a result posing a greater risk of infection complications. It has been reported that pregnant women were facing greater complications linked with COVID-19, as compared to non-pregnant women (13). The use of vaccines was the center of choice for the protection against COVID-19 infections (14). During the present time, pregnant women are at risk of being included in the COVID-19 vaccination, or even the policies being run for these, are full of ambiguity so they are hard to implement (15).

## **Conclusion**

Vaccination is a simple, safe, and effective way of protecting people against harmful diseases before they come into contact with them. We analyzed the e data of COVID-19 vaccinated candidates and the acknowledgement of COVID-19 immunization in pregnant women. Worrying about vaccine safety was the significant justification for hesitancy. Recognizing mentalities among study groups will be valuable for coming up with vaccine strategies that increment the ongoing pandemic.

## **References**

1. Center LPJN. Evaluation of Blood parameters, COVID-19 Vaccine Adverse effects, Hesitancy, and Acceptance rate in Pregnant Women: A Cross-sectional study. 2023;21(3):78-87.
2. Fauci AS, Lane HC, Redfield RRJNEJoM. COVID-19—navigating the uncharted. *Mass Medical Soc*; 2020. p. 1268-9.

3. Scalinci SZ, Battagliola ETJI. Conjunctivitis can be the only presenting sign and symptom of COVID-19. 2020;20:e00774.
4. y Galán JTGJN. Stroke as a complication and prognostic factor of COVID-19. 2020;35(5):318-22.
5. Le TT, Andreadakis Z, Kumar A, Román RG, Tollefsen S, Saville M, et al. The COVID-19 vaccine development landscape. 2020;19(5):305-6.
6. Ibrahim NKJJoI, health p. Epidemiologic surveillance for controlling COVID-19 pandemic: types, challenges and implications. 2020;13(11):1630-8.
7. French M, Monahan TJS, Society. Dis-ease surveillance: How might surveillance studies address COVID-19? 2020;18(1):1-11.
8. Organization WH. Global surveillance for COVID-19 caused by human infection with COVID-19 virus: interim guidance, 20 March 2020. World Health Organization; 2020.
9. Syed Anwar Aly SA, Abdul Rahman R, Sharip S, Shah SA, Abdullah Mahdy Z, Kalok AJJoer, et al. Pregnancy and COVID-19 pandemic perception in Malaysia: A cross-sectional study. 2021;18(11):5762.
10. Yang Z, Wang M, Zhu Z, Liu YJTjom-f, medicine n. Coronavirus disease 2019 (COVID-19) and pregnancy: a systematic review. 2022;35(8):1619-22.
11. Wang C-L, Wu C-H, Wang C-Y, Wang C-H, Long C-YJljoms. Impact of COVID-19 on Pregnancy. 2021;18(3):763.
12. Schmid MB, Fontijn J, Ochsenein-Kölble N, Berger C, Bassler DJTLID. COVID-19 in pregnant women. 2020;20(6):653.
13. Liu H, Wang L-L, Zhao S-J, Kwak-Kim J, Mor G, Liao A-HJJori. Why are pregnant women susceptible to COVID-19? An immunological viewpoint. 2020;139:103122.
14. London V, McLaren Jr R, Atallah F, Cepeda C, McCalla S, Fisher N, et al. The relationship between status at presentation and outcomes among pregnant women with COVID-19. 2020;37(10):991-4.
15. Rasmussen SA, Jamieson DJJO, gynecology. Coronavirus disease 2019 (COVID-19) and pregnancy: responding to a rapidly evolving situation. 2020.