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Assessment of Transient Abnormal Uterine Bleeding Patterns Post-COVID-19 Vaccination

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ABSTRACT

Background: In light of emerging global reports linking COVID-19 vaccination with menstrual disturbances, this study aimed to assess transient alterations in menstrual bleeding patterns following vaccination.

Methods: A cross-sectional observational study was conducted at the Department of Obstetrics and Gynaecology, Rawal Institute of Health Sciences (RIHS), Islamabad, from February 1, 2022, to December 31, 2023. A total of 1150 females were recruited using a non-probability consecutive sampling technique at the time of their COVID-19 vaccination. Women aged 18-40 years reporting post-vaccination menstrual changes were included. Exclusion criteria involved pre-existing menstrual irregularities (within the past three months), use of hormonal contraceptives, known pelvic pathologies, or age outside the defined range. Data were analyzed using SPSS version 25. The Chi-square test was used to determine associations, with a p-value <0.05 considered statistically significant.

Results: Among 1150 participants, 80 reported no menstrual changes, while 1070 experienced alterations. Of these, 805 (75%) had menorrhagia, 524 (65%) reported increased bleeding volume, and 281 (35%) had prolonged duration. Oligomenorrhea was seen in 265 (25%) participants; 159 (60%) reported decreased bleeding, while 106 (40%) experienced lengthened cycles. On follow-up, 58 cases of menorrhagia were evaluated; 18 were treated with MIRENA, and 10 underwent hysterectomy. Among the oligomenorrhea group, 22 were advised six-month follow-up.

Conclusion: The study highlights those menstrual irregularities post-COVID-19 vaccination were common but mostly transient. However, a subset of individuals exhibited persistent symptoms requiring clinical intervention.

Keywords: Covid-19, Vaccine, Menstruation, Menorrhagia, Oligomenorrhoea.

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INTRODUCTION

The unparalleled emergence of the COVID-19 vaccine stands as a pivotal intervention, safeguarding global health during the most critical phases of the pandemic[1]. Frequently reported unwanted effects of the COVID-19 vaccine encompass localized discomfort at the injection site, fatigue, fever, influenza-like symptoms, and myalgia[2]. Among these, temporary disturbances in menstrual patterns have emerged as a point of interest, particularly in women of reproductive age[3]. General physicians and reproductive health specialists were increasingly approached by women who reported changes in menstrual cycles shortly after receiving the COVID-19 vaccine. Such alterations in menstrual patterns were noted following both mRNA and adenoviral vector COVID-19 vaccines [4]. Episodes of abnormal uterine bleeding that appear after vaccination, were increasingly observed in clinical and community settings[5].Alterations in menstrual cycles and unanticipated vaginal bleeding have not been documented as adverse effects associated with the COVID-19 vaccine. Previously, HPV vaccination was reported to cause menstrual disturbances[3]. Numerous factors can influence menstruation including, endocrine disorders, gynecological conditions, autoimmune diseases, nutritional status and lifestyle changes[6]. Recent studies have indicated that SARS-CoV-2 infection, COVID-19 vaccination, and the stress associated with the pandemic can all impact the regularity of menstruation [7].

Females who experience changes in their menstrual pattern following vaccination report that it eventually returns to normal after a few cycles [8]. The association of menstrual changes after vaccination is probably due to the immune response to the vaccine, rather than any particular ingredient in the vaccine [9]. Biological mechanisms that link immune stimulus with menstruation include immunological influences on the hormones responsible for the cycle or effects mediated by immune cells in the endometrial lining, involved in the cyclical growth and shedding of endometrium [10].

This study was conducted to delineate the incidence and patterns of transient menstrual irregularities temporally associated with COVID-19 vaccination with an emphasis on the types of bleeding patterns, their temporal relationship to vaccination, and the duration until symptom resolve.

METHODS

This observational cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Rawal Institute of Health Sciences (RIHS), Islamabad, after obtaining ethical approval (RIHS-REC/078/21). The study period spanned from February 1, 2022, to December 31, 2023. Data were collected using a structured proforma after obtaining informed written consent from all participants.

The study targeted vaccinated females aged 18 to 40 years from the Rawalpindi and Islamabad catchment area. Participants included hospital employees and patients visiting the Outpatient Department (OPD), Inpatient Department (IPD), and Emergency Department who presented with complaints of menstrual irregularities following COVID-19 vaccination.

The sample size was calculated using the WHO sample size calculator, which estimated a minimum requirement of 386 participants. However, to enhance statistical power, enable subgroup analyses, and increase the generalizability of results, all eligible participants reporting during the study period were included, resulting in a total sample size of 1,150 females. The sampling technique used was non-probability purposive sampling, as participants were selected based on predefined inclusion criteria: vaccinated females within the specified age range presenting with new-onset menstrual changes after COVID-19 vaccination. Exclusion criteria included females with a history of menstrual irregularities in the three months before vaccination, those using hormonal contraceptives, individuals with menstrual disturbances due to known pelvic pathologies, and those younger than 18 or older than 40 years (peri-menopausal group).

According to the NICE guideline normal regular menstrual cycle was taken as a cycle of 28 days with bleeding lasting 4-6 days [11]. In women of reproductive age not using hormonal therapies, menstrual cycle less than 25 days or more than 36 days, a Cycle length less than 3 days or more than 7 days, and any quantity estimated more or less in comparison with previous cycles was defined as abnormal [12].

Detailed inquiry was done from the females related to their past menstrual cycle and comparison was made with changes after receiving the COVID-19 vaccine in terms of cycle length, bleeding days and amount of bleeding.

Statistical analysis was performed using SPSS version 25. Frequencies and percentages were calculated for categorical variables. The Chi-square test was applied to determine associations between menstrual alterations and clinical variables. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 1070 females who reported menstrual

irregularities after the COVID-19 vaccine were enrolled in this study. Females between the ages of 18 to 40 years were included, with a mean age of 29 years.

Table 1: Socio-Demographic Factors of Females in the Study Group

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–25	264	25
	26–35	518	48
	35–40	288	27
Education	Bachelors	492	46
	Intermediate	214	20
	Matric	161	15
	Masters	118	11
	Primary	32	3
	Middle	32	3
	Uneducated	21	2
Residence	Islamabad	835	78
	Rawalpindi	235	22
Marital Status	Married	621	58
	Unmarried	449	42
Social Status	Upper middle class (>70,000 PKR)	150	14
	Middle class (50,000–70,000 PKR)	642	60
	Lower class (<50,000 PKR)	278	26

Table 1 shows that out of 1150, a total of 1070 fulfilled inclusion criteria; 805 (75%) experienced menorrhagia; 524 (65%) had increased bleeding amount, and 281(35%) had increased bleeding days. Oligomenorrhea was observed in 265(25%) cases, including 159(60%) with decreased bleeding amount, 80(30%) who experienced increased length of cycle, and 26 (10%) had no missed period but a decrease in bleeding days.

Out of 1150 females interviewed, 1070 reported changes in menstrual cycle, and 80 reported no change p p-value <0.05 makes a statistically significant number with menstrual cycle changes after the COVID-19

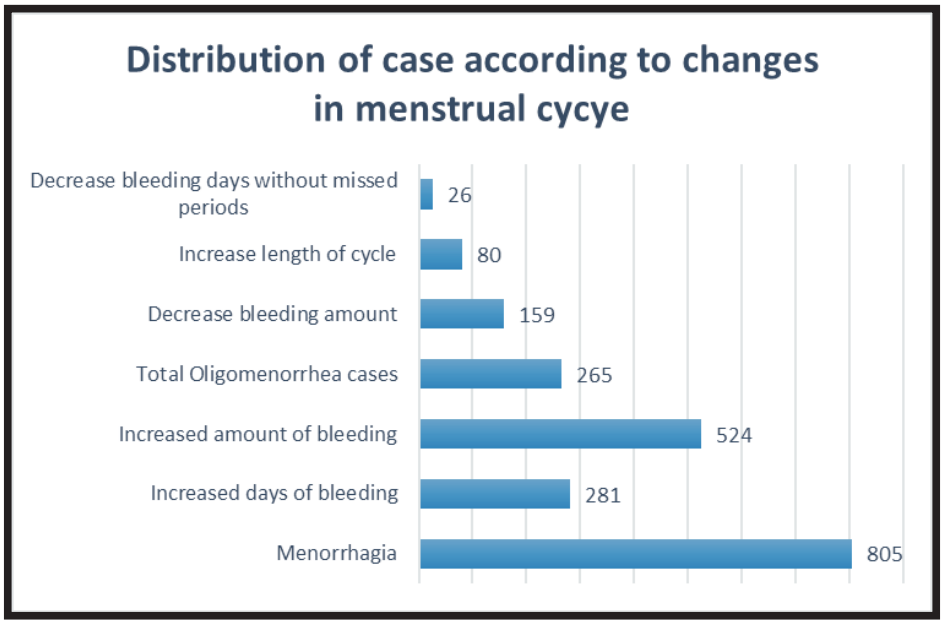

Fig.1: Distribution of Cases According to Bleeding Pattern

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Table 2: Follow-up Cases with Persistent Menstrual Irregularities (N=1150)!

Group	Number (%)	Presentation	Transient Changes (3–4 months, then settled)	Persistent Menstrual Irregularities (Follow-up cases)	Treatment in the Follow-up Group
Heavy Menstrual Bleeding	805 (70%)	• Increased bleeding amount	524	28	• 18 placed on MIRENA • 10 underwent hysterectomy
		• Prolonged bleeding (>7 days)	281	30	hormonal treatment (3 months)
Oligomenorrhoea	345 (30%)	• Scanty bleeding	206	12	Investigated for hormonal changes, no change found, counselled
		• Shortened duration (<3 days)	139	10	

Table 2 shows Regarding the follow-up of 58 cases from the menorrhagia group,28 females with increased amount of bleeding after 3 months of endometrial sampling underwent a procedure and 18 were treated with MIRENA, with satisfaction on follow-up, and 10 proceeded for hysterectomy due to failed hormonal treatment, affecting on quality of life with their complete family. In 30 females with an increased number of bleeding days, hormonal treatment was given for 3 months, and their complaints settled. In follow-up of oligomenorrhoea cases, 12 with decreased amount of bleeding and 10 with decreased days of bleeding were counselled and kept in follow-up for 6 months, and later on were investigated for hormonal changes, and no hormonal changes were found, and they were again counselled.

Table 3: Comparison of Menstrual Cycle Alterations Before and After COVID-19 Vaccination

Overall Impact on Menstrual Cycle			
Menstrual Cycle Change		**Number of Cases**	**P-Value**
Post-vaccine menstrual irregularity		1070	<0.05
No change in cycle after vaccination		80	
Subcategories of Menstrual Irregularities Before and After COVID-19 Vaccination			
Type of Irregularity	**Before Vaccination**	**After Vaccination**	**P-Value**
Menorrhagia (Abnormally heavy, requiring double protection)	6	518	<0.05
Prolonged Bleeding (Bleeding longer than a week)	4	277	
Oligomenorrhoea (Missed periods/increased cycle length)	5	75	
Decreased Bleeding Days (Without missed periods)	2	24	
Abnormally Light Bleeding (Reduced to spotting)	10	149	

Table 3 shows the overall impact of COVID-19 vaccination on menstrual cycle patterns among the study population. The first section shows the number of cases reporting post-vaccine menstrual irregularities compared to those with no change in their cycle, indicating a statistically significant difference ($p < 0.05$). The second section details specific subcategories of menstrual irregularities observed before and after vaccination, including menorrhagia, prolonged bleeding, oligomenorrhoea, decreased bleeding days, and abnormally light bleeding. All subcategories demonstrate a significant increase in incidence following vaccination ($p < 0.05$), suggesting a notable effect of COVID-19 vaccination on menstrual health.

DISCUSSION

The regularity of the menstrual cycle is associated with the health and fertility of females. Fluctuation in menstrual pattern is seen from month to month throughout the life of a female[13]. The International Federation of Gynecology and Obstetrics has introduced a new classification of patterns of the menstrual cycle. Regularly menstruating females can also experience occasional and stress-related changes in cycle, such as temporary changes in cycle length or amount[14].

Menstrual irregularity was reported in 1150 females, 805(70%) had menorrhagia, among them 524 had increased amount of bleeding, and 281 had increased days of bleeding, while 345(30%) had oligomenorrhoea, among them 206 had decreased amount of bleeding, and in 139 had a decrease in the number of days of bleeding.

The incidence of menstruation-related changes after COVID-19 vaccination varies significantly among published studies. A prospective cohort study by Edelman et al[15] recruited volunteers to investigate the effects of COVID-19 vaccines on menstrual symptoms (n=545) and found that 25% of patients reported changes in their menstrual cycle. Another similar study reported that about 50% to 60% of women of reproductive age had menstrual irregularities [16].

In a study by Wong et al[17] that analyzed 5,975,363 text responses entered into the V-safe surveillance application administered by the government, reported menstrual irregularities, an increase in severity of menstrual-related symptoms with incidence of menorrhagia (67.0%).

Menorrhagia has also been commonly reported after COVID-19 vaccination. In a survey of 7,904 pre-menopausal non-pregnant women by reported that 80.6% reported menstrual changes, had menorrhagia[18]. In a retrospective analysis, heavy menstrual bleeding was reported in 41.8% of 184 patients who experienced menstrual changes after covid vaccination[19].

Menstrual changes after vaccination are not uncommon, as similar alterations have been observed following vaccinations for other infections, such as the human papillomavirus [20].

The COVID-19 vaccine triggers the activation of T lymphocytes, which leads to the production of SARS-CoV-2 neutralizing antibodies[21]. In some females, there is an elevation in the number of leukocytes and macrophages within the endometrium. This increase may induce excessive vasodilation, subsequently contributing to menorrhagia

Post-vaccination oligomenorrhoea may be elucidated by the physiological mechanisms underlying functional hypothalamic amenorrhea[22,23]. In response to vaccination, the immune response prioritizes processes like the activation of T lymphocytes to generate antibodies against COVID-19. Resultant stress response disrupts the hypothalamic-pituitary-gonadal axis, resulting in oligo/amenorrhea in women.

Findings of our research align with what is currently documented in the literature that the COVID-19 vaccine is linked to alterations in the pattern of the menstrual cycle[24,25]. The changes reported by females indicate their fears and an effect on their quality of life.

CONCLUSION

Temporary alterations in menstrual cycle patterns were identified following COVID-19 vaccination. In a minority of cases, these disruptions extended beyond three cycles, requiring further diagnostic assessment and medical management. This highlights the importance of monitoring post-vaccination reproductive health and conducting longitudinal studies to clarify underlying mechanisms.

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ETHICAL APPROVAL

The study was conducted at the Department of Obstetrics and Gynecology, Rawal Institute of Health Sciences (RIHS), Islamabad, after obtaining approval from the ethical review committee ERC# RIHS-REC/078/21.

CONFLICT OF INTEREST

None

AUTHORS' CONTRIBUTION

All participants participated equally as per the ICMJE.

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