

# Does Covid-19 vaccination affect menstruation pattern?

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## ABSTRACT

**Background:** As Millions of people are receiving COVID-19 vaccine around the world, a number of side effects are being reported. Menstrual cycle disturbance is also a side effect reported by hundreds of women on social media. The objective of this study was to assess the association of menstrual abnormalities with COVID-19 vaccination.

**Subjects and methods:** This descriptive cross sectional study was conducted in Obstetrics and Gynecology OPD of Mufti Mehmoood Hospital D.I. Khan from March 2021 to June 2021. The health care workers who received Sinopharm COVID-19 vaccine and consented were included. Data was collected about change in menstrual cycle pattern after COVID-19 vaccination.

**Results:** A total of 80 subjects were included in the study with mean age of 32.6 +7.89 years. There were 36 (45.0%) doctors, 33 nurses (41.25%), 6 (7.5%) paramedics and 5 (6.25%) medical students. According to their marital status, 51 (63.75%) were married and 29 (36.25%) were unmarried. Out of 80 subjects, 16 (20%) reported disturbance in menstrual cycle pattern, 13 (81.2%) after first dose and 3 (18.75%) after both first and second dose. Among these 9 (56.25%) reported heavy menstrual bleeding, 4 (25%) had prolonged bleeding days while 3 (18.75%) had irregular bleeding pattern.

**Conclusion:** Menstrual cycle disturbance is a reported side effect of COVID-19 vaccination. It is more commonly reported after first dose and heavy menstrual bleedings is the most common pattern followed by prolonged/irregular bleeding.

## Keywords:

COVID-19, Vaccine, Menstruation, Vaccine Dose

## INTRODUCTION

The corona virus infectious disease-19 (COVID-19-19) is a newly emerged corona virus discovered in late 2019<sup>1</sup>. According to WHO report in February 2021, COVID-19 pandemic has resulted as severe respiratory disease causing millions of infections and deaths worldwide.<sup>2</sup> The global viral infection and the measures taken to reduce its spread, have seriously affected the world population in terms of adverse effects on mental and reproductive health.<sup>3</sup>

The most crucial step of SARS-CoV-2 infection transmission control is by vaccinating population across the communities. Vaccination stimulates the immune system resulting in the production of neutralizing antibodies against virus.<sup>4</sup> There are many strategies for vaccine preparation and some of these were used for corona virus vaccine preparation including the live inactivated, the subunit vaccines, and the nucleic acid-based vaccines. The US vaccine (by Pfizer-BioNTech and Moderna) is messenger RNA vaccines. Other vaccines (by Janssen-Johnson & Johnson, Astra-Zeneca, Sputnik-V and CanSino) are made using human and

primate adenovirus vectors. The Sinopharm and Sinovac are an inactivated whole-virus SARS-CoV-2 vaccines.<sup>5</sup> These vaccines have been developed rapidly using various technologies to control and prevent COVID-19 infection.<sup>4</sup> As Millions of people are receiving COVID-19 vaccine around the world, a number of side effects are being reported.

Although fever, sore throat and body aches are well known side effects of any vaccination so far, menstrual cycle disturbance is something not well explained. Hundreds of women have flooded social media to report changes in their menstrual cycles, which they say happened after taking the COVID-19-19 vaccine. Some women have claimed that their menstruation become heavier while others reported them to be irregular or prolonged and few menopausal women reported bleeding during menopause after receiving the shot. However the most common change reported is heavier than normal cycle usually after first dose. The United States Vaccine Adverse Event Reporting System (VAERS) received more than 323 menstrual cycle events associated with COVID-19 vaccine in May 2021 and the real figures could be even higher.<sup>6</sup> Thousands of women online around the world have questioned about the link between heavy or irregular menstruation and covid vaccine.

**Conflict of Interest:** The authors declared no conflict of interest exists.

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Menstruation like any other body function is an important indicator of a woman health. Any individual menstrual change can be triggered by many life events, including weight changes stress, or exercise. Similarly reproductive hormones and immune system can influence each other leading to altered mechanism in regeneration and breaking down the lining of endometrial cavity.<sup>7</sup> The Inflammatory reactions after COVID-19 vaccine can modulate estrogen response which could explain why certain women are having heavy periods after vaccine.

There is no good scientific evidence to know if the vaccine is directly causing the altered menstruation pattern. Unfortunately none of COVID-19 vaccine trial data has included menstrual changes as vaccine side effects.<sup>8</sup> The objective of this study was to determine the correlation/ link between COVID-19 vaccination and menstrual cycle pattern changes.

## SUBJECTS AND METHODS

This cross sectional Descriptive study was conducted in Obstetrics and Gynecology OPD of Mufti Mehmood hospital D.I. Khan from march 2021 to June 2021 after taking approval from institutional ethical committee .The lady health care workers and medical students who received Sinopharm COVID-19 vaccine and consented for the study were enrolled via convenience based sampling. Those having previous history of menstrual problem, or diagnosed cases of gynecological diseases like fibroid uterus, endometriosis, pelvic inflammatory disease, polycystic ovarian disease or taking medications for any gynecological problem/ using contraceptive methods or having history of any recent vaccination other than COVID-19 vaccine were excluded from study.

All included females were subjected to detailed history, physical examination and investigations like pelvic ultrasound or blood tests as needed by physician. All of them were given a questionnaire including demographics like age, occupation, marital status, and dose of vaccination. The symptoms of the menstrual cycle disturbance/change were the main outcome. Questionnaire included the information's about any change in menstrual cycle pattern after COVID-19 vaccination like heavy periods, irregular periods, prolonged periods or any other change in pattern of menstruation after first or second dose of COVID-19 vaccination. All of them were recording their menstrual cycle via diary/smart phone app. The questionnaire was collected after completion of COVID-19 vaccination and data recorded in a pre-designed proforma. The data

Table 1: Descriptive statistics of age

Number of patients	80
Mean	32.63
Median	30.50
Std. Deviation	7.62
Range	31.00
Minimum	19.00
Maximum	50.00

Table 2. Total no of female health care workers with COVID-19 vaccination

Subjects Included in study	With normal post COVID-19 vaccination menstrual cycle	With disturbed post COVID-19 vaccination menstrual cycle
Total (80)	64(80%)	16 (20%)
Married	41(64.06%)	10 (62.5%)
Unmarried	23(35.93%)	6 (37.5%)

Table 3. Distribution of the health workers with post COVID-19 vaccine menstrual cycle pattern changes (frequency percentage)

Pattern of menstrual bleeding	Number	Percentage
Heavy menstrual bleeding	9	56.2%
Prolonged bleeding	4	25.0%
Irregular bleeding	3	18.8%

Table 4. Distribution of subjects with post COVID-19 vaccination menstrual disorders according to age group

Age group	Number	Percentage (%)
19-28 years	6	37.5%
29-38 years	8	50.0%
39-43 years	2	12.5%

was entered and analyzed through SPSS. Means were calculated for continuous variables like age and frequency was calculated for categorical variables like marital status, menstrual cycle disturbance (yes/no) and dose of vaccination. Independent sample T test was used to determine the difference in age of patients in categories of patients with cycle disturbance and in category of number of doses of vaccination.

## RESULTS

A total of 80 subjects were included in the study with mean age of 32.6  $\pm$ 7.89 years (Table 1). Out of 80 subjects, there were 36 (45.0%) doctors, 33 nurses (41.25%), 6 (7.5%) paramedics and 5 (6.25%) medical students. Amongst these 51 (63.75%) were married and 29 (36.25%) were unmarried (Table 2). Out of 80 subjects, 16 (20%) reported changes in menstrual cycle pattern, 13 (81.2%) after first dose and 3 (18.75%) after both first and second dose. Among these 9(56.25%) reported heavy menstrual bleeding , 4 (25%) had prolonged bleeding days lasting for more than ten days while 3 (18.75%) had irregular bleeding pattern lasting for more than two weeks for which they took conservative pharmacological treatment and well responded. Amongst them 10(62.5%) were married and 6 (37.5%) unmarried. (Table 3) The age ranges with

number of patients who presented with menstrual abnormalities are mentioned in Table 4.

## DISCUSSION

The research data in which menstrual cycle bleeding changes were evaluated as a potential COVID-19 vaccine adverse event is limited. The female health care workers including doctors, nurses, paramedics and medical students were included in study because the COVID-19 vaccine acceptability in community was very low during study period.

While going through the literature, the author could hardly find a published research about post COVID-19 vaccination menstrual cycle disturbance. We found many reports on social media, twitters and newsletters about the association of COVID-19 vaccine and menstrual cycle pattern changes but no scientific study has been published yet, so this will probably be the first study conducted to present association between COVID-19 vaccine and menstrual cycle pattern changes. This was first formally reported by The Lily, a publication from Washington post which pointed out the impact of COVID-19 vaccines on menstrual bleeding that is heavy enough to require a trip to the emergency department or a visit to a gynecology clinic<sup>9</sup>. Many women were concerned that something abnormal was happening to menstrual cycle after COVID-19 vaccination. It could be a side effect just like a typical post vaccine fever.<sup>10</sup> Dr Kate Clancy, a medical anthropologist in USA, shared on Twitter her experience of heavy menstrual cycle following the Moderna vaccine, later on she received a lot of similar responses. Later on with her colleague Dr Katharine Lee, she launched a survey about COVID-19 vaccine and menstrual bleeding pattern changes and got 22,000 responses. Although the association is unproven but there are logical reasons that the vaccine could be causing changes to menstruation triggering an immune response in the endometrium.<sup>11</sup> The UK's Medicines & Healthcare Products Regulatory Agency has received more than 13,000 reports from women who have experienced menstrual cycle changes after having a COVID-19 vaccination dose.<sup>9</sup> The HPV (human papillomavirus) vaccine and the flu vaccine have been reported to affect menstruation in the past and same mechanism of vaccine action can be applied to COVID-19 vaccine<sup>12</sup>. Another study dating back to 1913, found that few women who received the typhoid vaccine experienced some sort of disturbance to their cycle in the months following vaccination<sup>13</sup>

The vaccines produce inflammatory mediators like cytokines and interferon's that stimulate immune system in body which might affect cells in the uterus lining to respond to immune mediators. This might cause the endometrium to shed differently than usual, causing altered menstrual cycle pattern.<sup>14</sup> To prove whether these menstrual changes are directly caused by the COVID-19 vaccine, menstrual flow should be monitored during clinical trials of the vaccine.<sup>15</sup>

In our study, although the sample size was small but 20% subjects reported changes in menstrual cycle pattern after COVID-19 vaccination and heavy flow (56.2%) was the most commonly reported event. This correlate with the survey of Dr Clancy where majority women reported heavy flow after COVID-19 vaccine.<sup>11</sup>

In our study, majority women (81%) reported altered menstrual cycle pattern with first dose of vaccine which got settled in subsequent cycles indicating its temporary effect. Alice Lu-Culligan and Dr Randi Hutter Epstein at Yale School of Medicine wrote in the New York Times that although no research has been done yet to prove the link between COVID-19 vaccine and changes in menstruation, one unusual period after vaccination is not alarming and this usually happens after first dose.<sup>16</sup> In another report by CNN many women who reported changes to their menstrual cycle find that it returned to normal the following cycle.<sup>17</sup>

Women who are of the reproductive age are generally not included in clinical trials of vaccines because of the fear of potential effects of a vaccines on unknown pregnancy and concerns about reproductive health .When women do participate in clinical trials, they are not specifically asked about side effects related to menstrual changes. They might report such things, but whether or not such changes are recorded in clinical trials is often unknown to the public.<sup>7</sup> The author started data collection due to the observation about female health care workers coming to outpatient department complaining about menstrual cycle disturbance after COVID-19 vaccination. We have raised a question and generated a hypothesis which could be tested more effectively by large sample size. The major strength of this study is women who participated were health care workers and educated class. All of them were recording their menstrual cycle pattern using hand written diary or smart phone app, therefore their data of menstrual cycle is unlikely to be biased.

There are several limitations to this study. The sample size was small due to less COVID-19 vaccine uptake by women in local community and even among

female health care workers because of vaccine hesitancy and fear of side effects. Refusing a vaccine when one is available is known as “vaccine hesitancy. World Health Organization has considered vaccine hesitancy as a major global health problem in 2019. Vaccine hesitancy is caused by misinformation as there is much controversy about COVID-19 vaccine.<sup>8</sup> This problem can be overcome by education, motivation, and promotion of vaccine acceptance by healthcare workers and society leaders to combat vaccine distrust. The other limitation to this study was the subjects included who were healthcare workers and might be more significantly affected by the pandemic due to enhanced workplace stress and fear of exposure to COVID-19-19 and might report more menstrual cycle events linking it to COVID-19 vaccine.

However this study provides a valuable insight into reproductive health issues of women due to COVID-19 vaccination which was the main focus of the study. This study recorded the observation of the first few months of the vaccine introduction (March to June 2021) in Pakistan, however the longer term effects are likely to depend on the length of the pandemic and future varieties of COVID-19 vaccines. Future work is needed and the vaccine makers should collect data about menstrual cycle’s pattern changes during randomized trials. If scientist do eventually find link between vaccine and changes in menstrual bleeding, that would not be a reason to avoid vaccine, as the benefits certainly outweigh the heavy periods.

The Boston University team in USA has been funded from the National Institutes of Health (NIH) to investigate whether COVID-19-19 vaccines have an impact on menstruation. They will evaluate SARS-CoV-2 vaccination and changes in menstruation during six cycles of follow-up. The team will look for associations between corona virus vaccination and cycle irregularity, heavy bleed, inter menstrual bleeding, and other symptoms associated with menses after data collection from 1800 women.<sup>18</sup>

## CONCLUSION

Menstrual cycle pattern change/disturbance is a reported side effect of COVID-19 vaccination. It is more commonly reported after first dose of vaccine and less frequent after subsequent dose indicating a temporary effect of vaccine on menstrual cycle. Heavy menstrual flow is the most common pattern followed by prolonged/irregular bleeding.

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