



## MENSTRUAL IRREGULARITIES IN FEMALE HEALTHCARE WORKERS FOLLOWING COVID VACCINATION: A CROSS SECTIONAL OBSERVATIONAL STUDY.

### Physiotherapy

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### ABSTRACT

**Aim Of The Study:** To study the menstrual irregularities in female healthcare workers in the age group of 18-45 years following COVID vaccination. **Method:** A self-reporting questionnaire, was designed and after being validated, was administered via email and telephonic interviews to female healthcare workers in the age group of 18-45 years as they were amongst the first to receive the COVID vaccine. From April-November 2021, 132 respondents, mainly from Mumbai, some from Pune, Nashik & Aurangabad completed the questionnaire. The questionnaire pertained to and gathered details of two consecutive menstrual cycles following the first dose and the booster dose of the COVID vaccine. **Result:** Following the first dose of the COVID vaccine, it was found that around 26% experienced delayed menses, 14% reported menorrhagia and around 12% of the women experienced severe dysmenorrhoea. Following the booster dose, 31% reported delayed menses, 16% reported menorrhagia and 11% experienced severe dysmenorrhoea. **Conclusion:** Menstrual irregularities following the COVID vaccination (first & booster dose) predominantly included delayed menses, menorrhagia, severe dysmenorrhoea than experienced otherwise, followed by early menses and scanty bleeding.

### KEYWORDS

COVID vaccination, female healthcare workers, menstrual irregularities

### INTRODUCTION

2 years ago, the world over, COVID-19 changed the way everyone functions in almost every tiny and perceptible way. In India, it began with the very first few cases in February 2020 which soon reached hundreds, thousands and then lakhs by April 2020. To fight against the spread of the disease, India (like many other nations) went into lockdown in various stages from March 2020 onwards for the first few months. This allowed the healthcare and other frontline workers to do their best not only in fighting the disease but also preventing the spread of the infection. As the strict restrictions during the lockdown were slowly eased, social distancing norms were announced. The COVID 19 virus went from being a virus that little was known about to one of the most researched viruses in the year 2020.

As everyone knows, science with its combination of technology has made indomitable progress in the last few decades. This has never been more evident than in the year 2020 when COVID vaccines were developed in a short span of time following an exhaustive research process. In India, data regarding the healthcare and frontline workers was gathered in late 2020 as they would be the first to receive the vaccines. This started in January 2021 in the most orderly and meticulous manner; a mammoth task for a hugely populous country like India.

The first dose of Covishield vaccine was then administered to the healthcare workers. A second booster dose was administered after a gap of 4 weeks. Following that, throughout the year, after the healthcare and the frontline workers, the geriatric population and those at risk for infection were vaccinated. The vaccinations were then opened for the younger age groups. In the last year and half, more research regarding corona virus has given way to more vaccines being developed and made available, as also for vaccines being safe to use for children. In India, predominantly used vaccines are Covishield, Covaxin and more recently, Corbevax.

In the last one year, more variants of the corona virus have been detected and continue to create havoc the world over. The recent ones being the delta and the omicron variants. Most developed countries have recommended and administered a third booster (precautionary) dose of the vaccine. In fact, with the alarming rise in infections, due to the omicron variants, countries have re-imposed partial lockdowns. In India, at the beginning of 2022 many states had imposed a night curfew in a bid to help prevent the spread of infection.

Presently, all have received the booster dose of the vaccine. In India,

children in the age group of 12-15 years too, have received it. The pandemic seems to be in its endemic stage with fewer cases being reported and the severity of the disease being less. Vaccination has played an important role in controlling the pandemic.

### METHODS

After obtaining the Institutional Ethics Committee approval, a self-reporting questionnaire was designed and validated. This was then administered via email and telephonic interviews to participants after informed consent. The online mode was the preferred mode as this study was carried out when the second wave was at its peak and reduced in person interactions. Data was collected from healthcare workers post vaccination in Mumbai as well as some parts of Pune, Nashik and Aurangabad.

The present study conducted in April- November 2021, observed the menstrual irregularities in the female healthcare workers following covid vaccination. A total of 132 respondents completed the questionnaire. It followed the menstrual cycle for 2 cycles post the vaccine doses. The type of irregularities like breakthrough bleeding, dysmenorrhoea, polymenorrhoea and menorrhagia were studied. It holds true in the light of newer variants and therefore newer vaccines being developed to combat the mutations by the coronavirus.

### Inclusion Criteria:

1. Vaccinated female healthcare workers and students in the age group of 18-45 years, who had taken the COVID vaccine; (main and booster dose.) and who were willing to participate in the study.

### Exclusion Criteria

1. Vaccinated healthcare workers with a previous history of and/ or presently experiencing menstrual irregularities.
2. Vaccinated healthcare workers undergoing treatment of menstrual irregularities, known gynaecological conditions, endocrine disorders.
3. Vaccinated healthcare workers on oral contraceptive pills.

132 participants in the period between April-November 2021, completed the questionnaire. Of these, around 50 % were healthcare workers including doctors, physiotherapists and nurses, 40% were healthcare students while the rest were hospital office staff. Almost all the healthcare workers had worked regularly through the lockdown attending to and treating COVID patients in various capacities and had received their vaccination in the initial drive for vaccination. All had received the Covidshield vaccine.

## OBSERVATIONS AND RESULTS

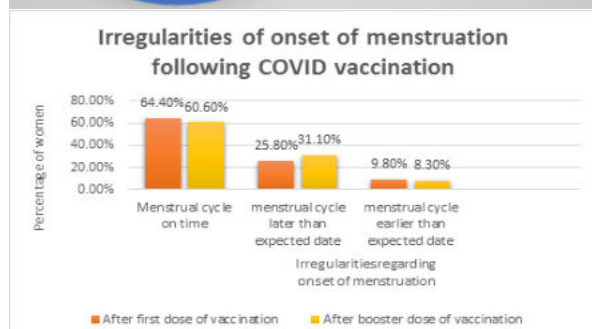
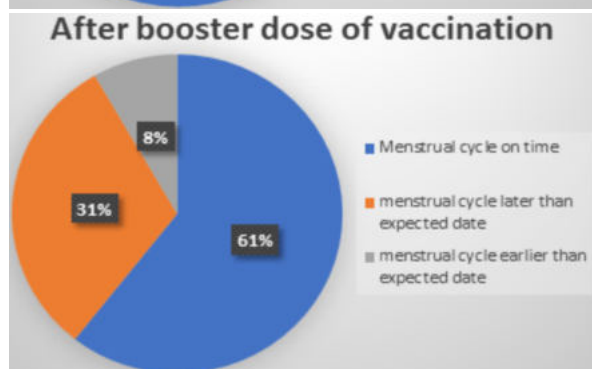
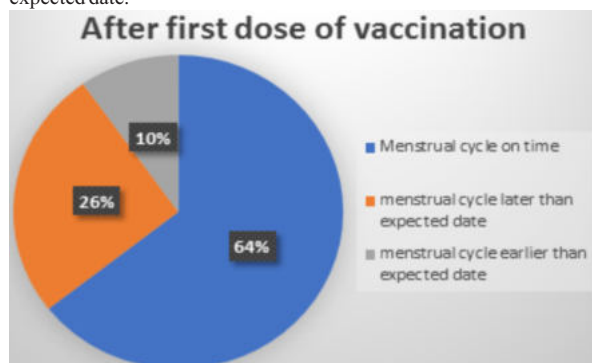
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Almost all the healthcare workers had worked regularly through the lockdown attending to and treating COVID patients in various capacities and had received their vaccination in the initial drive for vaccination. All had received the Covishield vaccine.

### Irregularities Regarding Onset Of Menstruation In The First Cycle Following COVID Vaccination

In the first menstrual cycle after the first dose of the vaccine, around 26% women reported that the next menstrual cycle was later than the expected date while around 10 % reported that it was earlier than the expected date.

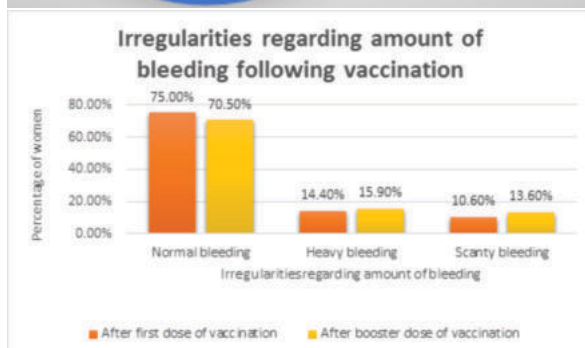
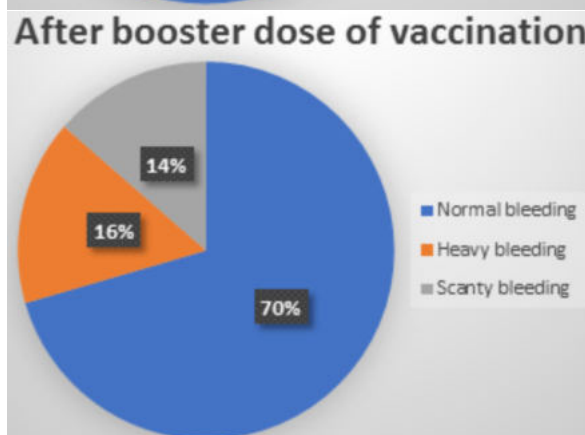
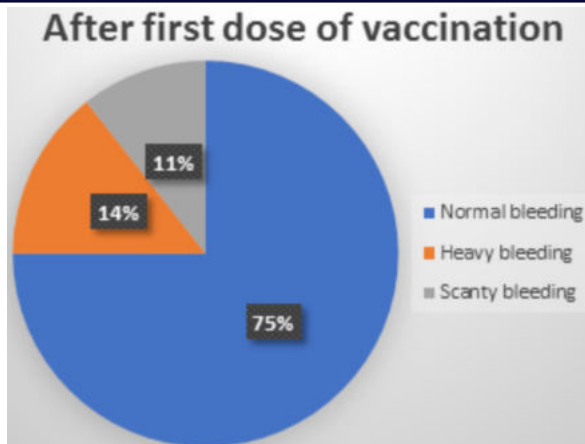
In the first menstrual cycle following the booster dose, 31% women reported that the menstrual cycle was later than the expected date while 8% women reported that the menstrual cycle was earlier than the expected date.



### Irregularities Regarding Amount Of Bleeding In The First Cycle Following COVID Vaccination

In the first menstrual cycle after the first dose of vaccination, 75% experience normal bleeding, 14% women reported heavy bleeding while 11% women reported scanty bleeding.

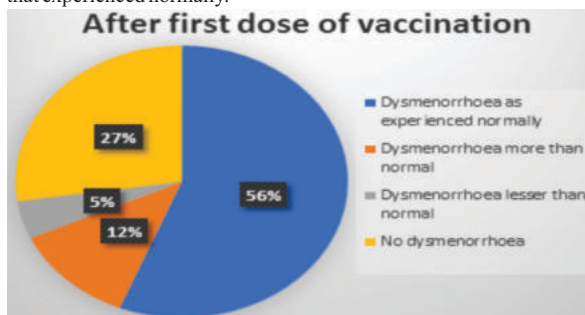
In the first menstrual cycle following the booster dose of vaccination, 70% women experienced normal bleeding, 16% women reported heavy bleeding during the menses while 14% reported scanty bleeding during the menses. and 11 % experienced dysmenorrhoea more than normal.

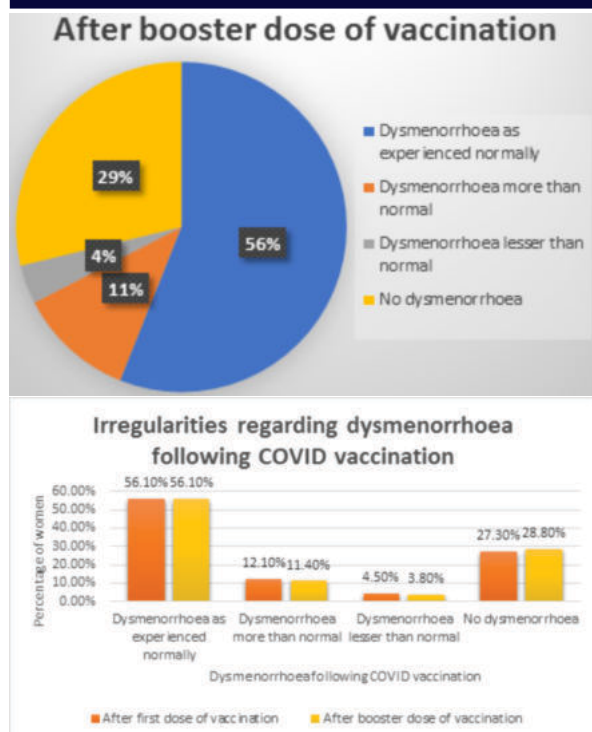


### Irregularities Regarding Dysmenorrhoea In The First Menstrual Cycle Following COVID Vaccination

In the first menstrual cycle after the first dose of the vaccine, 56% of the women reported dysmenorrhoea as experienced normally, 27.5% reported no dysmenorrhoea, 12% reported dysmenorrhoea more than that experienced normally, 5% experienced lesser dysmenorrhoea than that experienced normally.

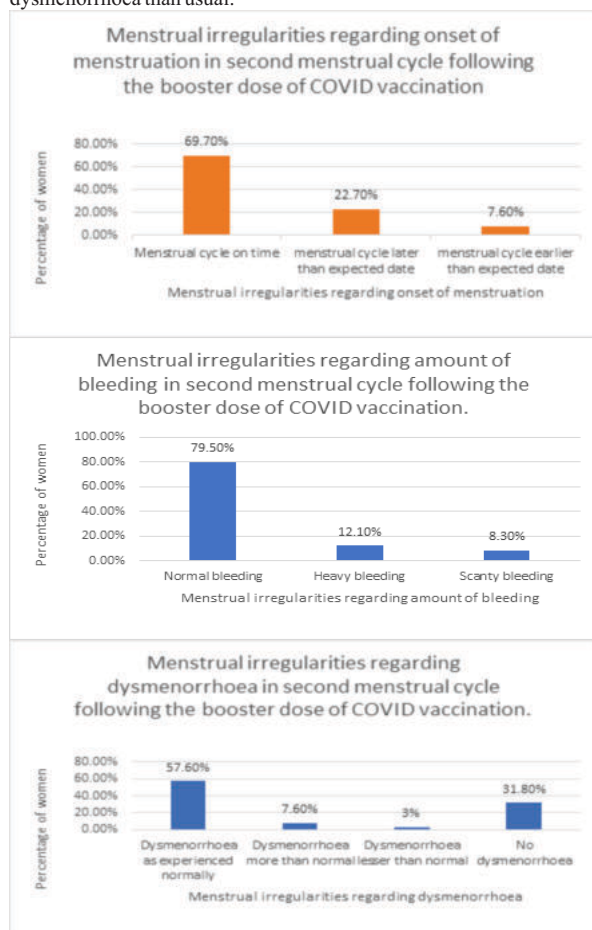
In the first menstrual cycle following the booster dose, 56% of the women reported dysmenorrhoea as experienced normally, 29% reported no dysmenorrhoea, 11% reported dysmenorrhoea more than that experienced normally, 4% experienced lesser dysmenorrhoea than that experienced normally.





#### Menstrual Irregularities In Second Menstrual Cycle Following The Booster Dose Of COVID Vaccination

In the second cycle of menstruation following the booster dose, 22% women reported that they experienced their second menstrual cycle at a later than the expected date while 7 % reported it earlier than the expected date. Of these 12 % reported heavy bleeding while 8 % reported scanty bleeding. 7% amongst these experienced more dysmenorrhoea than usual.

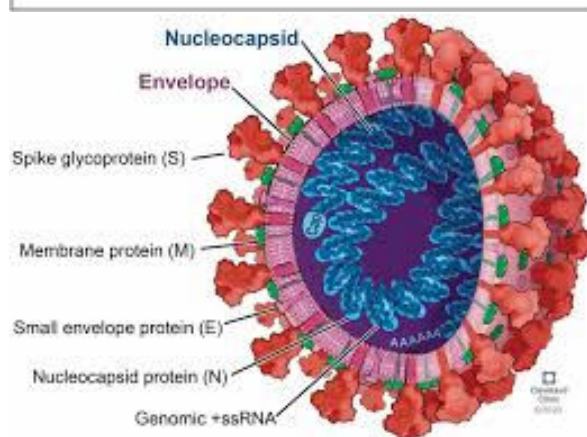
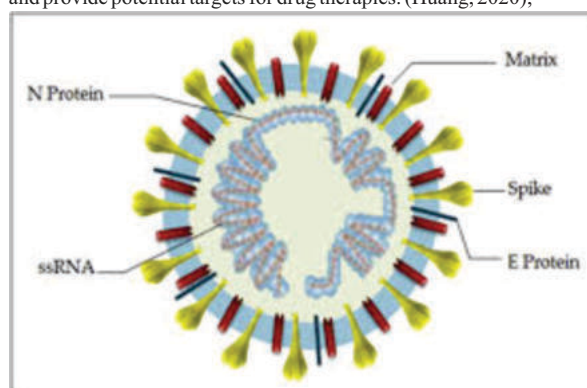


## DISCUSSION

### Structure of coronavirus

Coronaviruses are involved in human and vertebrate diseases. Coronaviruses are members of the subfamily Coronaviridae in the family Coronaviridae and the order Nidovirales. The recent emergence of a novel coronavirus with an outbreak of unusual viral pneumonia in Wuhan, China and then pandemic outbreak is 2019-nCoV or COVID-19. (Mousavizadeh, 2020). The structure of the COVID 19 virus bears a close resemblance to the genera Beta coronavirus. This in turn has a resemblance to that of severe acute respiratory syndrome-related coronaviruses (SARSr-CoV) and the virus uses ACE2 as the entry receptor-like SARS-CoV.2. Due to these similarities, the virus has been named as SARS-CoV-2 by the Coronavirus Study Group of the International Committee on Taxonomy of Viruses. SARS-CoV-2 is a single-stranded RNA-enveloped virus. COVID-19 is a spherical or pleomorphic enveloped particles containing single-stranded (positive-sense) RNA associated with a nucleoprotein within a capsid composed of matrix protein. The envelope bears club-shaped glycoprotein projections. (Mousavizadeh, 2020).

A large number of glycosylated S proteins cover the surface of SARS-CoV-2 and bind to the host cell receptor angiotensin converting enzyme 2 (ACE2), mediating viral cell entry. When the S protein binds to the receptor, TM protease serine 2 (TMPRSS2), a type 2 TM serine protease located on the host cell membrane, promotes virus entry into the cell by activating the S protein. Once the virus enters the cell, the viral RNA is released, polyproteins are translated from the RNA genome, and replication and transcription of the viral RNA genome occur via protein cleavage and assembly of the replicase-transcriptase complex. Viral RNA is replicated, and structural proteins are synthesized, assembled, and packaged in the host cell, after which viral particles are released. These proteins are critical to the viral life cycle and provide potential targets for drug therapies. (Huang, 2020),



### COVID 19 Infection (WHO – Corona Virus Disease (COVID-19) Pandemic)

As per WHO, common symptoms of Coronavirus infection include fever, cough, tiredness and loss of taste and smell. The less common symptoms include sore throat, headache, aches, pains, skin rash, red and / or irritated eyes, diarrhoea. Serious symptoms, on the other hand include difficulty in breathing, loss of speech, mobility and confusion. It was also noted that people with comorbidities were and are more susceptible to the coronavirus infection. Co-morbidities are cardiovascular and cerebrovascular disease as well as diabetes. Several abnormalities also have been observed including cellular immune deficiency, coagulation activation, myocardial injury, hepatic and kidney injury, and secondary bacterial infection. (Mousavizadeh, 2020) (Rawat, 2021)

### COVID Vaccination Side Effects

Over the last one year, many vaccines were developed and have completed phase 1,2,3 trials. In India, The Covishield was the first one to be administered followed by Covaxin. The AstraZeneca vaccine (Covishield) uses a modified chimpanzee DNA adenovirus, which has not been exposed to human populations and does not generate an immune response to the adenovirus itself, but only to the viral protein encoded in the host DNA. (Mascellino, 2021)

In India, after the initial administration of the Covishield vaccine, many people complained of various side effects ranging from tiredness, lethargy, fatigue, malaise, slight rise in temperature to high grade fever with chills, vomiting and nausea. These were documented ranging from 1 day post vaccination to about 7 -10 days post vaccination.

### COVID Vaccination & Menstrual Irregularities

The present study found that following the vaccination there were some disturbances in the menstrual cycle. Majorly among them were delayed menses, menorrhagia and more severe dysmenorrhoea. Also reported were earlier onset of menses before the expected date and dysmenorrhoea. These persisted for the two menstrual cycles following the booster dose as well. The vaccines have proven efficacy and have been pivotal in controlling the pandemic. This study throws light on the effect of the vaccine over the menstrual cycle.

### CONCLUSION

The present study reports that menstrual irregularities following the COVID vaccination predominantly included delayed menses with menorrhagia and more severe dysmenorrhoea than experienced otherwise, followed by early menses and scanty bleeding. The same trend was observed in the first and the second menstrual cycle following the booster dose of the vaccine.

### Concluding Remarks

As newer variants of the COVID 19 virus continue to be detected and as newer vaccines are developed, there is a need to study their effect on the menstrual cycle in women.

Long term effect on the menstrual cycle following COVID 19 vaccination, can be explored.

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**Conflict of interest:** None Declared

### REFERENCES

1. Mousavizadeh, L., & Ghasemi, S. (2021). Genotype and phenotype of COVID-19: Their roles in pathogenesis. *Journal of Microbiology, Immunology and Infection*, 54(2), 159–163. <https://doi.org/10.1016/j.jmii.2020.03.022>
2. Huang, Y., Yang, C., Xu, X. F., Xu, W., & Liu, S. W. (2020). Structural and functional properties of SARS-CoV-2 spike protein: potential antivirus drug development for COVID-19. *Acta Pharmacologica Sinica*, 41(9), 1141–1149. <https://doi.org/10.1038/s41401-020-0485-4>
3. Mascellino, M. T., di Timoteo, F., de Angelis, M., & Oliva, A. (2021). Overview of the Main Anti-SARS-CoV-2 Vaccines: Mechanism of Action, Efficacy and Safety. *Infection and Drug Resistance*, Volume 14, 3459–3476. <https://doi.org/10.2147/idr.s315727>
4. World Health Organization. (n.d.). *Corona virus disease (COVID 19) pandemic*. WHO. Retrieved August 31, 2022, from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
5. Rawat, K., Kumari, P., & Saha, L. (2021). COVID-19 vaccine: A recent update in pipeline vaccines, their design and development strategies. *European Journal of Pharmacology*, 892, 173751. <https://doi.org/10.1016/j.ejphar.2020.173751>