

Review of: "Different pattern of menstrual in patients with COVID-19 infections"

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There are very limited studies regarding the impact of non-sexually transmitted infections (n-STIs) affecting the menstrual cycle or menstruation period in fertile adult women. However, abnormal menstrual bleeding or irregular period have been known due to different bacterial and fungal/yeast infections (bacterial vaginosis) that spread to the upper reproductive tract, including uterus. However, very few studies have been performed correlating the n-STIs impact of women's menstrual bleeding. A recent study has indicated 16% percent of adult women reported an altered menstrual cycle as a post-acute sequelae of SARS-CoV-2 (PASC) [1]. And these females with altered menstrual cycle had greater number of COVID-19 symptoms than women with unaltered periods during the infection. Of note, altered menstrual cycle was reported in obese females with COVID-19 more frequently than lean-healthy women^[1]. The most common changes in menstrual cycle in this study involved were irregular menstruation (60.0%), an increase in premenstrual syndrome symptoms (45.0%), and infrequent menstruation (35.0%). Another study has indicated that the change in the menstrual cycle during COVID-19 infection occurred without any alteration in the sex hormones levels, but may be due to an effect as result of transient change in sex hormones that may have affected ovaries, which should have resumed to normal quickly after the termination of the infection^[2]. As stress can alter menstrual cycle, resulting in menorrhagia or amenorrhea so COVID-19 associated stress may also cause this in some women as stress suppresses the immune response so these women also represent more COVID-19 symptoms than women without any abnormality in their menstrual cycle^[3].^[4]^[5]^[6].

The present study is novel and add another factor that COVID-19-associated abnormal menstrual cycle occurred in females independent of the use of anticoagulants in the treatment plan indicating the non-involvement of the altered blood-coagulation system during the infection^[7]. This study has included a large cohort of females (175, 8 out of them were in ICU) of reproductive age that validates its novelty further. They have followed the guidelines of the American Society of Hematology (ASH) to include anticoagulants in their treatment plan. In their study, 57 patients (32.4%) did not receive anticoagulants, 76 patients (43.2%) received prophylactic anticoagulation mainly asoposid (30.3%), and 43 patients (24.4%) received therapeutic anticoagulation mainly revaspire (41.9%).

Their study has also supported previous studies and showed a highly significant difference between the pattern of menstruation before COVID infection and menstruation after COVID-19 infection depending on the number of days of menstrual bleeding. However, both increased and decreased menstrual flow, including amenorrhea (4 females) with short and longer duration of bleeding have been observed. This indicates the COVID-19-associated stress impacts women reproductive cycle. Even reports of altered menstruation with COVID-19 vaccinations have been reported^[8]^[9]^[10]. Hence, increasing evidence of altered menstrual cycle in both COVID-19 infected females and vaccinated females indicates that

in addition to infection-associated stress and altered coagulation as a side effect in some vaccinated females some other factors, including altered immune environment, including the immune cells (macrophages and natural killer (NK) cells in the uterus and ovaries may impact menstrual cycle [11][12]. A study has indicated the similarity in the pattern of altered menstrual cycle during COVID-19 infection and in females receiving COVID-19 vaccination and this effect is independent of type of vaccine received [13][14][15]. Hence further studies in these people as well as experimental studies to understand the impact of COVID-19 and vaccination on female reproductive tract (FRT) are essentially required due to the increasing incidence of altered female health in this group of people. This is because ovaries release mature eggs, this process is regulated by their immune cells (macrophages) along with hormones and uterus is the organ that prepares itself for fertilization and supporting the entire pregnancy, any immunologic alteration in these female organs can affect their reproductive life, including getting pregnant and bearing a child [16][17][18][19]. Hence, this issue should not be ignored and taken as serious issue of women health, especially their reproductive period that gives them an opportunity to be a mom.

References

1. ^Sana M. Khan, Alexandra Shilen, Kelly M. Heslin, Providence Ishimwe, et al. (2022). SARS-CoV-2 infection and subsequent changes in the menstrual cycle among participants in the Arizona CoVHORT study. *American Journal of Obstetrics and Gynecology*, vol. 226 (2), 270-273. doi:10.1016/j.ajog.2021.09.016.
2. ^Kezhen Li, Ge Chen, Hongyan Hou, Qiuyue Liao, et al. (2021). Analysis of sex hormones and menstruation in COVID-19 women of child-bearing age. *Reproductive BioMedicine Online*, vol. 42 (1), 260-267. doi:10.1016/j.rbmo.2020.09.020.
3. ^Lindsay T. Fourman, Pounesh K. Fazeli. (2015). Neuroendocrine Causes of Amenorrhea—An Update. doi:10.1210/jc.2014-3344.
4. ^Omer Demir, Hidayet Sal, Cihan Comba. (2021). Triangle of COVID, anxiety and menstrual cycle. *Journal of Obstetrics and Gynaecology*, vol. 41 (8), 1257-1261. doi:10.1080/01443615.2021.1907562.
5. ^Maureen Groër, Judith Carr, Mary Sue Younger. (1993). Relationships Between Self-Reported Symptoms of Infection, Menstrual-Cycle-Related Distress, and Cycle Phase. *Behavioral Medicine*, vol. 19 (1), 13-19. doi:10.1080/08964289.1993.9937560.
6. ^Shahida Nagma. (2015). To Evaluate the Effect of Perceived Stress on Menstrual Function. *JCDR*. doi:10.7860/jcdr/2015/6906.5611.
7. ^Omnia B. Bakr, Alaa H. El-keky, Rania Gamal. (2022). Different pattern of menstrual in patients with COVID-19 infections. *Qeios*. doi:10.32388/QU7R2K.
8. ^Victoria Male. (2022). Menstruation and covid-19 vaccination. *BMJ*. doi:10.1136/bmj.o142.
9. ^Victoria Male. (2021). Menstrual changes after covid-19 vaccination. *BMJ*. doi:10.1136/bmj.n2211.
10. ^Ebba Hallberg, Anders Sundström, Maria Larsson, Veronica Arthurson, et al. (2022). Association Between Menstrual Cycle Length and Coronavirus Disease 2019 (COVID-19) Vaccination: A U.S. Cohort.

doi:10.1097/aog.0000000000004781.

11. [^] Sourima Biswas Shivhare, Judith N. Bulmer, Barbara A. Innes, Dharani K. Hapangama, et al. (2015). Menstrual cycle distribution of uterine natural killer cells is altered in heavy menstrual bleeding. *Journal of Reproductive Immunology*, vol. 112 , 88-94. doi:10.1016/j.jri.2015.09.001.
12. [^] Marina Berbic, Ian S Fraser. (2013). Immunology of Normal and Abnormal Menstruation. *Womens Health (Lond Engl)*, vol. 9 (4), 387-395. doi:10.2217/whe.13.32.
13. [^] Nadia Muhaidat, Mohammad A Alshrouf, Muayad I Azzam, Abdulrahman M Karam, et al. (2022). Menstrual Symptoms After COVID-19 Vaccine: A Cross-Sectional Investigation in the MENA Region. *IJWH*, vol. Volume 14 , 395-404. doi:10.2147/ijwh.s352167.
14. [^] Alison Edelman, Emily R. Boniface, Eleonora Benhar, Leo Han, et al. (2022). Association Between Menstrual Cycle Length and Coronavirus Disease 2019 (COVID-19) Vaccination. doi:10.1097/aog.0000000000004695.
15. [^] Ebba Hallberg, Anders Sundström, Maria Larsson, Veronica Arthurson, et al. (2022). Association Between Menstrual Cycle Length and Coronavirus Disease 2019 (COVID-19) Vaccination: A U.S. Cohort. doi:10.1097/aog.0000000000004781.
16. [^] A Bukovsky, J Presl. (1979). Ovarian function and the immune system. *Medical Hypotheses*, vol. 5 (4), 415-436. doi:10.1016/0306-9877(79)90108-7.
17. [^] Diane M Duffy, CheMyong Ko, Misung Jo, Mats Brannstrom, et al. (2018). Ovulation: Parallels With Inflammatory Processes. doi:10.1210/er.2018-00075.
18. [^] Haifeng Ye, Xiaoyan Li, Tuo Chen Zheng, Xia Liang, et al. (2016). The effect of the immune system on ovarian function and features of ovarian germline stem cells. *SpringerPlus*, vol. 5 (1). doi:10.1186/s40064-016-2390-3.
19. [^] Sourima Biswas Shivhare, Judith N. Bulmer, Barbara A. Innes, Dharani K. Hapangama, et al. (2015). Menstrual cycle distribution of uterine natural killer cells is altered in heavy menstrual bleeding. *Journal of Reproductive Immunology*, vol. 112 , 88-94. doi:10.1016/j.jri.2015.09.001.