

The Effect of Covid-19 Vaccines on Menstrual Cycle in Selected Bangladeshi Female Population

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(Received: November 25, 2023; Accepted: March 20, 2024; Published (web): July 30, 2024)

Abstract

The pandemic associated with the coronavirus disease hit Bangladesh in the year of early 2020, which was a part of the global pandemic caused by SARS-CoV-2. Six vaccines, namely Moderna, Pfizer, Covishield, Sinopharm, Sinovac and Janssen out of the eight vaccines approved by WHO, were received by the Bangladeshi people. A cross-sectional online survey comprising a descriptive questionnaire was carried out to find the effect of Covid vaccine on menstrual cycle. The longer, shorter or absence of menstrual cycles and any changes in menstrual flow were taken under consideration during the survey. The majority of the respondents (82.5%) was of 20-30 years old females. Among the total 309 responders, 210 women experienced vaccine associated side effects while fever was experienced by 36.5%, 19.1% experienced fatigue and 21.4% was reported to suffer from headache. Muscle and joint aches as well as pain, swelling and redness were noted to be 38.5% (most common) and 26.4%, respectively among others. Statistically significant ($p < 0.01$) fluctuation was observed in menstrual cycle although mostly persisting for only one cycle. About 70% of the women noted to have regular menstrual cycle before vaccination, which was decreased to 56% including about 10-14% females experiencing different fluctuation in menstrual flow. Medications taken to alleviate the vaccine-related side effects as well as to regulate normal menstrual cycle were also recorded in the survey. This study attempted to identify the impact of COVID vaccine on menstrual cycle and no significant conclusive negative effect on women's reproductive health was recorded.

Key words: Women's health, menstrual health, COVID vaccine, cycle length.

Introduction

In the month December of 2019, China reported an overflow case of pneumonia and severe respiratory disorders due to an unknown cause in Wuhan, the Hubei capital of China (Dhar Chowdhury and Oommen, 2020). The cases were traced back to a seafood market in Huanan (Li *et al.*, 2020). Upon taking samples from the patients and sequencing, a novel virus was discovered (Zhu *et al.*, 2020). The virus was named SARS-Cov-2 and the disease that it causes was titled Coronavirus Disease or Covid-19 (WHO, 2021). SARS-Cov-2 is an RNA virus which binds to the angiotensin converting enzyme-2 (ACE-

2) receptor inside the human body via its spikes protein and releases its genome inside the cell, replicates and produces protein and exerts its pathophysiological effects (Luan *et al.*, 2020). Due to its' high transmissibility (Sanche *et al.*, 2020), it didn't take long for it to have a worldwide outbreak. Assessing situation all around the globe on march 11 March, 2020 World Health Organization, WHO declared coronavirus as a pandemic (WHO, 2020). As of 3rd of January, 2022 there have been 290,723,229 cases worldwide, among which 254,661,677 recovered and 5,462,015 died (Worldometer, 2022).

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DOI: <https://doi.org/10.3329/bpj.v27i2.75183>

Bangladesh had its first case reported on 8th March, 2020 (Reuters, 2020). The government of Bangladesh declared lockdown to curb the spread of covid-19 on the 23rd of March 2020 although essential services were available to some extent according to necessity and duration of the day. The lockdown was extended, and tightened and relaxed lifted and reissued assessing the deaths and cases throughout the pandemic (Better work, 2022). As of 3rd of January 2022 Bangladesh had 1,587,140 cases out of which 1,549,771 recovered and 28,081 died (Worldometer, 2022).

From the very start of pandemic there was massive motivation and endeavors to develop and effective vaccine. On December 2020, the first vaccines, two mRNA vaccines Pfizer/BioNTech and Moderna were approved by the FDA for emergency use in the USA (Anand and Stahel, 2021). All in all, there are eight vaccines that are approved by regulatory bodies recognized by WHO: Pfizer–BioNTech, Oxford–AstraZeneca, Sinopharm BIBP, Moderna, Janssen, CoronaVac, Covaxin and Novavax and there many more under the evaluation of WHO (WHO, 2022a). Bangladesh started its vaccination from late January, 2021 whereas mass vaccination started from the second week of February that year (Aljazeera, 2021, Anadolu Ajansi, 2021). The population of Bangladesh is mainly being vaccinated by five vaccines Moderna, AstraZeneca, Pfizer/BioNTech, Sinopharm and Sinovac(COVID-19, Vaccination Dashboard for Bangladesh, 2022). There were several side-effects after being injecting with vaccine. It ranged from common local effects pain, swelling, redness to systemic reactions like headache, fatigue, dizziness, myalgia and to some serious effects like lowered hemoglobin, increased bilirubin, altered Serum Glutamic Oxaloacetic Transaminase, SGOT and Serum Glutamic Pyruvic Transaminase, SGPT (Kaur *et al.*, 2021) and even cerebral venous thrombosis (Franchini *et al.*, 2021). The term side-effects are sort of a misnomer, as it is reaction of our own body's immunological responses to the vaccines, which is a good sign as it tells us that the vaccine is working. Depending on the type of vaccines being administered; the vaccine works in

different ways. Along with all of these side-effects and rumors and myths circulating about the vaccines there has been a widespread suspicion and paranoia about the long term after effects of the vaccines (CDC, 2021). The principal goal of the vaccines is to make the body familiar with the virus so that when the body is actually infected the body can recognize the foreign entity and mount up a defense against the virus. Moderna, Astra Zeneca, Pfizer/BioNTech, Sinovac has an efficacy rate of 94%, 70%, 95% and 50% respectively (Statista, 2021); Sinopharm has an efficacy rate of 79% (WHO, 2022b) Although the vaccines being approved through proper trials validating its safety and efficacy (WHO, 2022c) the long-term effects are yet to be properly ascertained and understood. This survey was conducted upon menstruating woman with that goal in mind to shed some light upon this aspect, to determine the various complication and effects that are observed with menstruation after being vaccinated.

Method

A descriptive cross-sectional study was performed to identify the effect of Covid vaccine on menstrual cycle. In order to collect data an online survey was performed using Google form. The questionnaire (added as supplementary material) was distributed using various electronic as well as social media platforms (Facebook, Email and WhatsApp) and snowball sampling method was used for this purpose. Since impact on menstrual cycle was our aim of the study so females ageing 15 or more were the target participants. Due to the high percentage of young people using internet, majority of our participants were under 40 years. The declaration of Helsinki was followed throughout the study and informed consent was obtained from study subjects. Ethical approval for the study was obtained from State University of Bangladesh (Approval number-2021-11-01/SUB/A-ERC/004).

The survey comprised of 31 questions (Supplementary file A). Lengthening, shortening, absence of menstrual cycle as well as any changes in menstrual flow all were taken into consideration.

Side effects experienced after taking the vaccines, premenstrual syndromes reported by participants, medicines taken to improve side effects and medicines taken to improve menstrual abnormality were also given emphasize. Before finalizing the questionnaire a thorough search was done on PubMed using keywords-vaccines, changes in menstrual cycle, premenstrual syndrome to cover all possible impacts on menstrual cycle. A total of 309 responses were collected. After analyzing the responses all of them were included for the statistical analysis.

Before participating in the survey informed consent was obtained from all the participants. It was clearly mentioned that the identity of the participants will be kept confidential. The goal of the study was also informed prior starting the survey.

In order to analyze the data statistically Graph pad version 9.3.1 and Microsoft word 2010 were used. Most of the questions aimed at qualitative data so descriptive statistics were applied. The data is represented using tables, bar diagrams and pie charts.

Results and Discussion

Description of study sample: The sociodemographic data of the study participants are summarized in table 1. Among the 309 responders, majority of the women, about 82.5%, were from the age group 20-30 years old. About 45% of the total women surveyed lived in metropolitan areas compared to 45.6% who lived in urban areas. 50% of the women were physically active and about 8.4% and 22% of the women reported to have thyroid disorder and hormone disorders, respectively. 10.4% of the women had history of cervical cancer or carcinoma. About 25% of the women were sexually active, whereas only 11% took oral contraceptives.

Side effects from vaccination: The five vaccines given to the people of Bangladesh at the time of conducting this study were Moderna, Pfizer, Covishield, Sinopharm and Sinovac. The vaccines received by majority of participants (46.3%) were from Sinopharm. Moderna and Covishield were received by 18% of the women. Around 10% and 2%

of the women had received Pfizer and Sinovac respectively (Figure 1). Out of the five vaccines distributed among Bangladeshi population, the bulk portion of our participants received Sinopharm due to the availability of the aforementioned vaccine. (COVID-19 Vaccination Dashboard for Bangladesh, 2022).

Table 1. Sociodemographic profile of the study participants.

Feature	Frequency (N)	Percentage (%)
Age		
15-20	14	4.5
21-30	255	82.5
31-40	25	8.1
41-50	10	3.2
>50	5	1.6
Area of living		
Rural area	29	9.4
Urban area	141	45.6
Metropolitan area	139	45
Occupation		
Housewife	12	3.9
Student	212	68.6
Service holder	85	27.5
Physical exercise level		
No	155	50.2
< 3 times a week	110	35.6
>3 times a week	44	14.2
Sexually active		
Yes	78	25.2
No	231	74.8
Consumer of oral contraceptive pills		
Yes	34	11
No	275	89
History of cervical carcinoma		
Yes	277	89.6
No	32	10.4
History of thyroid disorder		
Yes	26	8.4
No	283	91.6
History of hormonal disorder		
Yes	68	22
No	241	88

Fever as well as muscle and joint aches were found to be the most common side effects after vaccination. Pain, swelling and redness were also reported in many of the women. Among 210 women who experienced side effects after vaccination, 36% experienced fever, 19% reported fatigue and 21%

suffered from headache. The most common side effects reported (about 38.5%) were muscle and joint aches and 26% reported pain, swelling and redness. Loss of appetite and chills were rare and was experienced by 6% of the women surveyed (Figure 2).

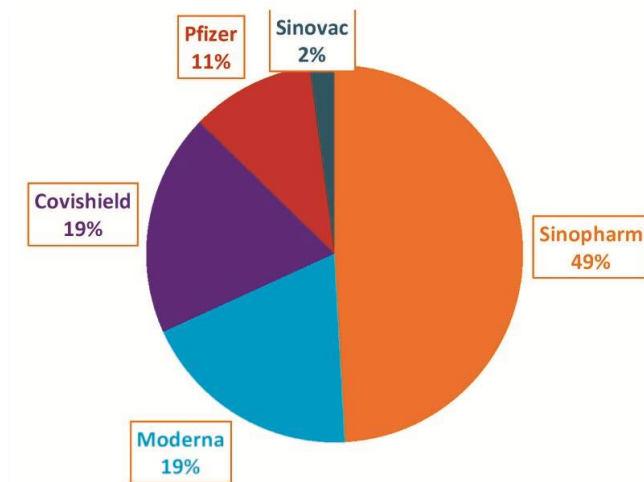


Figure 1. Different vaccines received by Bangladeshi women.

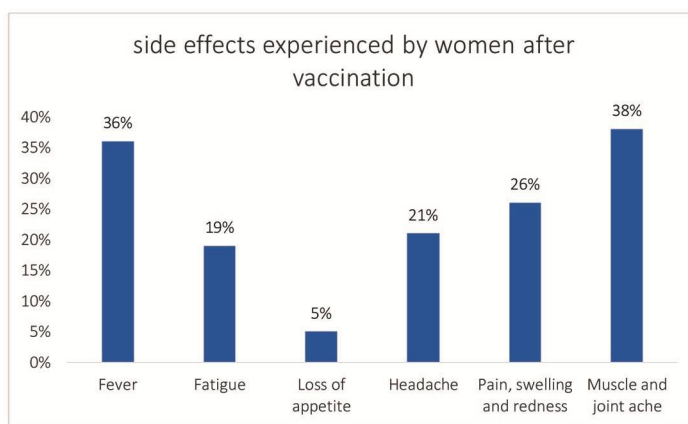


Figure 2. Different side effects experienced by participants after vaccination.

Vaccine specific side effects showed that most of the participants receiving Sinovac had experienced all side effects taken into consideration in the current study (Table 2). Although only six of the participants received Sinovac thus increasing the sample size will give a better picture of the actual number of participants experiencing the side effects. Majority of the participants (52.9%) receiving Pfizer vaccine has developed fever whereas the percentage was quite

less (5.96%) in case of those receiving vaccine from Sinopharm. The percentage of participants experiencing fatigue was quite similar for participants receiving Pfizer, Moderna, Covishield and Sinopharm vaccines. All the participants receiving Sinovac vaccine experienced headache, whereas 47.05% participants who received Pfizer vaccine has experienced headache. Muscle and joint ache were most common among those who received Pfizer and Sinovac vaccines.

Premenstrual and menstrual side effects experienced by women upon vaccination: 21.7% and 5.5% of women suffered from mood swings and bloating, respectively. About 12% suffered from acne

and abdominal pain and cramps. But majority of the women did not suffer from any menstrual side effects (Table 3).

Table 2. Vaccine specific side effects observed among study participants.

	Moderna N=59	Pfizer N=34	Covishield N=59	Sinopharm N=151	Sinovac N=6
Fever	17 (16.95)	18 (52.9)	12 (20.33)	9 (5.96)	6 (100)
Fatigue	10 (25.4)	10 (29.4)	15 (25.4)	18 (11.92)	6 (100)
Loss of appetite	4 (6.7)	4 (11.8)	3 (5.08)	1 (0.66)	3 (50)
Headache	12 (20.3)	16 (47.05)	15 (25.42)	17 (11.25)	5 (83.33)
Pain, swelling and redness	14 (23.72)	19 (55.88)	23 (38.9)	18 (11.92)	6 (100)
Muscle and joint ache	27 (45.8)	30 (88.2)	28 (47.5)	27 (17.88)	5 (83.33)

Table 3. Different pre-menstrual syndrome effects observed after vaccination.

Pre-menstrual syndrome	N (%)
Bloating	17 (5.5)
Mood swings	67 (21.7)
Acne	38 (12.3)
Abdominal pain or cramps	40 (12.9)
None	197 (63.8)

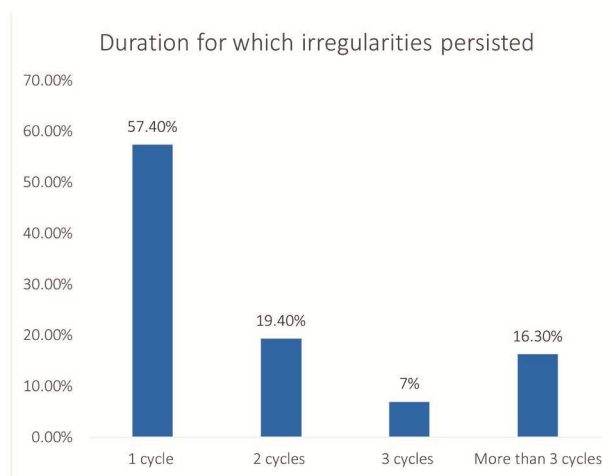


Figure 3. Number of cycles experiencing irregularity.

Changes in menstrual cycle:

Vaccination caused a change in duration of menstrual cycle, where majority of the participants experienced a cycle longer than usual whereas fewer

participants had shorter cycles. Very few women encountered fluctuating cycles after vaccination. Data on menstrual flow was also recorded but striking differences was not observed. Change in flow was

recorded for about 10-14% of women (Figure 3). Many women did not have any pre-menstrual side effects; mood swings were the most pronounced and frequent side effects from vaccination although these irregularities only persisted for one cycle in more than 50% of the participants. The findings were statistically significant with $p < 0.01$.

Before vaccination, around 70% of the women had regular menstrual cycle, which decreased to 56%.

After vaccination, percentage of women having longer menstrual cycle increased by 7.4%. Fluctuating cycle which may be defined as variation in the length of the cycle was reported by 11% before vaccination and 14% after vaccination. However, percentage of women having shorter menstrual cycle doubled after vaccination, from 3% to 6% (figure 4).

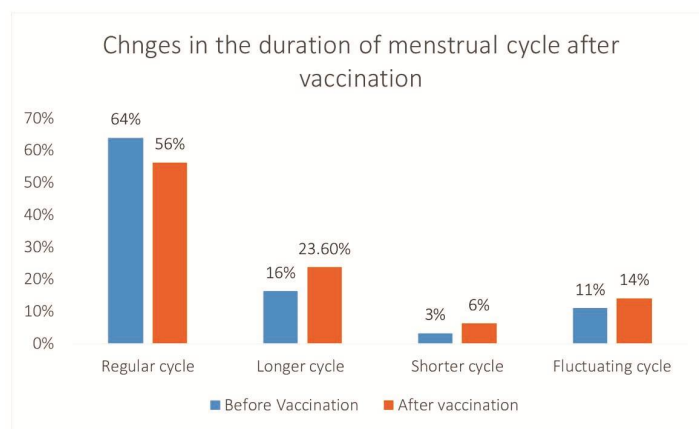


Figure 4. Changes in menstrual cycle and their frequency before and after receiving covid vaccine.

Table 4. Effects of covid vaccine on menstrual bleeding.

Changes in menstrual bleeding	Frequency (%)
Increased bleeding	37 (12.0)
Decreased bleeding	33.(10.7)
Heavier period flow	41 (13.3)
Lighter period flow	36 (11.7)

After vaccination, about 12% of women reported increased bleeding and lighter period flow. However, decreased bleeding and heavier period flow was recorded for 10.7% and 11.7% of women respectively (table 4).

Medications taken to improve side effects: Data was obtained on medications taken to alleviate vaccine-related side effects and also on medications to regulate normal menstrual cycle (Table 5). Anti-pyretics and non-steroidal anti-inflammatory drugs (NSAIDs) were the most common drug of choice used to combat inflammation and fever due to the aftermath of vaccination. Among the medications

taken to counteract the side effects following vaccination, the antipyretics class of drug was most commonly used, accounting for about 90%. About 11% of the women also used saline or oral rehydration solution and only 5% took anti-inflammatory drugs to relieve the side effects. 1% of women used antispasmodics such as drotaverine or tiemonium methylsulphate whereas 1.9% women used antibiotics to relief side effects.

On the other hand, only 53 (17.15%) women took medications to improve menstrual cycle. The most commonly used drug was metformin, being used by 47.2% of women followed by oral contraceptives which were used by about 9% of women. 2% of women reported to consume ibuprofen. Only one-sixth of the women took medications to maintain their normal menstrual cycle, and metformin was the drug of choice. This may be explained because metformin is often used to treat patients suffering from polycystic ovarian syndrome.

Table 5. Medications taken to improve different type of side effects of covid vaccine.

Drugs	Frequency (%)
Medications taken to improve side effects of vaccines (N=309)	
Anti-inflammatory: aspirin (300 mg), ketorolac (10 mg), diclofenac (100 mg)	16 (5)
Anti-pyretic: acetaminophen, 500 mg)	278 (90.1)
Antispasmodic: drotaverine (80 mg), tiemonium methylsulphate (50mg)	3 (1)
Saline/ORS	34 (11)
Antibiotics	6 (1.9)
Medications taken to improve effect of vaccine on menstrual cycle (N=53)	
Metformin (500 mg)	25 (47.2)
Oral contraceptives	5 (9.4)
Ibuprofen (400 mg)	1 (1.9)
Others	25 (47.2)

Conclusions

Although the pandemic has been going on for more than two years, the world has not reeled from the effects of the virus. To bring about the normal ways of life of the pre-pandemic era, scientists have been working hard from day one to develop safe and effective vaccines. Within a short span of time, a number of efficient vaccines have been developed and approved by the regulatory bodies under emergency Investigational New Drug (IND). Therefore, the long-term implications of the vaccines are not properly known yet. Although, very recently a very rare side effect known as vaccine induced immune thrombocytopenia and thrombosis (VTT) associated with Covishield (Oxford-AstraZeneca) vaccine has come to light calling for its withdrawal from international market (British Heart Foundation, 2024). In an attempt to delve into the effects of the vaccines on menstrual cycle, our study was conducted. Observable changes have been recorded in the cycle after vaccination, but it was not interminable as most of the changes only lasted for no more than one cycle. Recent studies supporting the data reported an increase in menstrual cycle length by less than one day and they were regarded as short-term side effects of vaccination (Male, 2021). Another study revealed that these side effects were seen in people receiving mRNA vaccines as well as

vaccines associated with adenovirus vectors, suggesting that these reactions are not specific to vaccine components, rather a consequence of immune reactions occurring after vaccination (Gov.UK, 2022). Menstrual cycle changes are also seen in women after receiving vaccination against Human Papilloma Virus (Suzuki and Hosono, 2018). Possible mechanisms are believed to involve the effect of immunological reactions on hormones such as estrogen, progesterone, follicle stimulating hormone and luteinizing hormone (Karagiannis and Harsoulis, 2005) and effect of immune cells on the lining of uterus (Monin et al., 2019). Thus, we can conclude that from this study that there is not any conclusive negative effect on women's reproductive health. Whilst the study is unique in its nature, due to the small sample size and the infrequent responses in some of the queries of the survey, further research with large number of participants should be conducted to better elucidate the findings of this study.

Conflict of interest

There is no conflict of interest disclosed by the authors.

References

- Aljazeera. 2021. Retrieved from <https://www.aljazeera.com/news/2021/1/28/bangladesh-starts-covid-vaccination-drive/> (Accessed on January 3, 2022).
- Anadolu Ajansi.2021. Retrieved from <https://www.aa.com.tr/en/asia-pacific/bangladesh-starts-nationwide-covid-vaccination-drive/2136643/> (Accessed on January 3, 2022).
- Anand, P. and Stahel, V. P. 2021. Review the safety of Covid-19 mRNA vaccines: a review. *Pat. Saf. Surg.* **15**, 20.
- Better Work. 2022. Retrieved from <https://betterwork.org/portfolio/covid-timeline-in-bangladesh/> (Accessed on January 3, 2022).
- British Heart Foundation. retrieved from <https://www.bhf.org.uk/> (Accessed on May 13, 2024)
- CDC. 2021. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/facts.html> / (Accessed on January 3, 2022).
- COVID-19 Vaccination dashboard for Bangladesh. Retrieved from <http://103.247.238.92/webportal/pages/covid19-vaccination-update.php> / (Accessed on January 4, 2022).
- Dhar Chowdhury, S., and Oommen, A. M. 2020. Epidemiology of COVID-19. *J. Dig. Endosc.* **11**, 3-7.
- Franchini, M., Liumbruno, G. M. and Pezzo, M. 2021. COVID-19 vaccine-associated immune thrombosis and thrombocytopenia (VITT): diagnostic and therapeutic recommendations for a new syndrome. *European J. Haematol.* **107**, 173-180.
- GOV.UK. 2022. Retrieved from <https://www.gov.uk/government/publications/coronavirus-covid-19-vaccine-adverse-reactions/coronavirus-vaccine-summary-of-yellow-card-reporting#annex-1-vaccine-analysis-print/> (Accessed on 28 January, 2022).
- Karagiannis, A. and Harsoulis, F. 2005. Gonadal dysfunction in systemic diseases. *European J. Endocrin.* **152**, 501-513.
- Kaur, R. J., Dutta, S., Bhardwaj, P., Charan, J., Dhingra, S., Mitra, P., Singh, K., Yadav, D., Sharma, P. and Misra, S. 2021. Adverse events reported from covid-19 vaccine trials: a systematic review. *Indian J. Clin. Biochem.* **36**, 427-439.
- Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K. S. M., Lau, E. H. Y., Wong, J. Y., Xing, X., Xiang, N., Wu, Y., Li, C., Chen, Q., Li, D., Liu, T., Zhao, J., Liu, M. and Feng, Z. 2020. Early transmission dynamics in wuhan, china, of novel coronavirus-infected pneumonia. *New Eng. J. Med.* **382**, 1199-1207.
- Luan, J., Lu, Y., Jin, X. and Zhang, L. 2020. Spike protein recognition of mammalian ACE2 predicts the host range and an optimized ACE2 for SARS-CoV-2 infection. *Biochem. Biophys. Res. Comm.* **526**, 165-169.
- Male, V. 2021. Menstrual changes after covid-19 vaccination. *BMJ*, **16**, 374.
- Monin, L., Whettlock, E. M. and Male, V. 2020. Immune responses in the human female reproductive tract. *Immunology* **160**, 106-115.
- Sanche, S., Lin, Y. T., Xu, C., Romero-Severson, E., Hengartner, N. and Ke, R. 2020. High contagiousness and rapid spread of severe acute respiratory syndrome coronavirus 2. *Emerg. Infect. Dis.* **26**, 1470.
- Reuters. 2020. Retrieved from <https://www.reuters.com/article/us-health-coronavirus-bangladesh-idUSKBN20V0FS/>. (Accessed on January 3, 2022).
- Statista. 2021. Retrieved from <https://www.statista.com/chart/23510/estimated-effectiveness-of-covid-19-vaccine-candidates/> (Accessed on January 22, 2022).
- Suzuki, S., and Hosono, A. 2018. No association between HPV vaccine and reported post-vaccination symptoms in Japanese young women: results of the Nagoya study. *Papill. Res.* **5**, 96-103.
- WHO. 2020. Retrieved from <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020/> Accessed on January 3, 2022).
- WHO. 2021. Retrieved from [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it/](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it/) (Accessed on January 3, 2022).
- WHO. 2022a. Retrieved from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines/> (Accessed on January 3, 2022).
- WHO. 2022b. Retrieved from <https://www.who.int/news-room/feature-stories/detail/the-sinopharm-covid-19-vaccine-what-you-need-to-know/> (Accessed on January 22, 2022).
- WHO. 2022c. Retrieved from [https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-vaccine-research-and-development/](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-vaccine-research-and-development/) (Accessed on January 4, 2022).
- Worldometer. 2022. Retrieved from <https://www.worldometers.info/coronavirus/> (Accessed on January 3, 2022).
- Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., Zhao, X., Huang, B., Shi, W., Lu, R., Niu, P., Zhan, F., Ma, X., Wang, D., Xu, W., Wu, G., Gao, G. F. and Tan, W. 2020. A novel coronavirus from patients with pneumonia in China, 2019. *New Eng. J. Med.* **382**, 727-733.

Supplementary File-A

1. Where do you live? (Optional)
 2. Describe your period flow.
 3. What is your profession? (Optional)
 4. Are you physically active?
 5. Which age group do you belong to?
 6. Do you have any thyroid disorder(s)?
 7. Do you have any hormonal imbalance disorder(s)?
 8. Do you have any of the following? a. Pcos, b. Thyroid disorder, c. Hormonal disorder
 9. Are you vaccinated?
 10. Are you married?
 11. If you are married, did you experience any change in libido after vaccination?
 12. Which of the following vaccine did you receive?
 13. How many doses of the vaccine did you receive?
 14. When did you receive your final dose of vaccine?
 15. Which of the side effects did you experience after vaccination?
 16. Are you sexually active?
 17. Describe your menstrual cycle before vaccination.
 18. Describe your menstrual cycle after vaccination.
 19. If there was delay in your menstrual cycle, by how many days was it delayed?
 20. After vaccination, did you experience any of the following:
a. Increase in cycle b. Decrease in cycle c. No change
 21. After vaccination, did you experience any abnormal amount of menstrual bleeding?
 22. For how many cycles did the irregularities persist?
 23. Did you notice any change in period flow after vaccination?
 24. If your menstrual cycle was shorter, which of the following would you suggest was the duration of your menstrual cycle?
 25. Did you take any medications to improve your menstrual cycle?
 26. If yes, what medication(s) did you take?
 27. Did you take any medication to improve side effects of vaccination?
 28. If yes, which of the following medications did you take?
 29. Do you take any contraceptives?
 30. Do you have any family history of ovarian or cervical carcinoma (cancer)?
 31. Do you feel emotionally affected ?
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