

Examining the Frequency of Complications Caused by Sinopharm Vaccine Injection in Pregnant Mothers Referred to Baharlo Hospital

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Abstract

Throughout history, humanity has experienced various diseases, and today, Covid-19 was declared a pandemic by WHO, which changed the course of normal life. Like other diseases, scientists and doctors have been looking for the most practical method of treatment and prevention. This endeavor led to successfully providing society with vaccines made in various approaches. However, due to the sensitivity of certain groups, such as elderly and pregnant women, the officials sought to prioritize immunizing the mentioned group, while some concerns are about the specific side effects. Many studies have been done on statistical societies with various indicators, which are not considered sensitive groups. In this research, the main focus is on the reactions of pregnant women under pregnancy control in Baharloo Hospital (Tehran, Iran) 14 days after the injection of only one or two doses of the Sinopharm vaccine. This research investigated parameters such as pregnancy duration and mother's health factors (Diabetes, Hypertension, and history of COVID19 infection), in addition to 19 side effects of Sinopharm vaccine injection. The data was obtained on a daily schedule and through telephone interviews.

Introduction

Throughout history, the world has witnessed the spread of certain diseases in a period of time, for instance, the Antonine Plague in 165 to 180 AD with about 5 million deaths, the Spanish flu, about 50 million deaths from 1918 to 1919, and smallpox, which the last natural example of the smallpox virus was diagnosed in 1977, and the World Health Organization (WHO) confirmed the eradication of the disease in 1980. On March 11, 2020, the WHO declared the Covid-19 pandemic [1]. Coronavirus disease 2019 (COVID-19), which was seen in Wuhan, China, for the first time, is a viral infection caused by severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) [2] that includes a different range of diseases: mild, moderate, severe, critical cases and asymptomatic ones. SARS-CoV-2 target usually is the respiratory system which results in upper respiratory tract infection (URTI), and its transmission way between people is by droplets of an infected person, apart from being symptomatic or not. Covid19 causes several complications in various organs, such as the cardiovascular, kidney, liver, and endocrine systems. Some common clinical manifestations of COVID-19 in symptomatic patients are fever and chills, fatigue, cough, pneumonia, and dyspnea, of which most signs and symptoms last 2 to 14 days [3].

With all of the COVID19 complications, the condition will be more critical for pregnant patients, as studies showed. During this period, factors such as the level of hormones leaving the normal level and the shrinking of the lung volume due to the physical changes of the mothers' body and the weakening of the mothers' immune system put them in the category of sensitive groups. Also, due to the way the fetus is fed, the possibility of disease transmission is a concern by numerous doctors. Despite the low risk of transplacental transmission of COVID19, these cases increase the risk of preeclampsia, preterm birth, and low birth weight in a severe form of the disease [4]. A systematic review of several nations showed that severe COVID-19 disease occurred in 18% of pregnant people, and 5% were critical cases. In addition, studies found that miscarriage in the first trimester and higher mortality rate and intubation in the second and third trimester [5].

One way to prevent the disease from spreading is by developing an appropriate vaccine that has significantly influenced this pandemic worldwide. Vaccines' classification is based on their design techniques, and the most common classification divides into classical and new generation vaccines [6]. Classic vaccines contain inactivated viruses, virus-like particles, and protein subunits, while new generation vaccines contain nucleic acid, viral vectors, and antigen-presenting cells. The fear of fetal complications always prevents administering drugs and vaccines during pregnancy; some do not cause complications but also prevent many dangerous diseases for the fetus. Routine vaccination, including inactivated influenza, diphtheria, tetanus, and hepatitis B during pregnancy, is safe. According to US Centers for Disease Control (CDC), there is little evidence of increased

risks of congenital problems in the fetus following maternal vaccination during pregnancy with vaccines containing inactivated or bacterial viruses or toxoids[7].

Even though pregnant mothers, as a vulnerable group, were advised to receive the vaccine immediately, in many studies, pregnant and lactating women were excluded from most vaccination clinical trials. However, in several reports that present the need for animal testing in the early stages of developing the corona vaccine, no specific results have been seen in the pregnant group. Tom T. Shimabukuro et al. examined the side effects of mRNA vaccines (Pfizer and Moderna) in pregnant women. In this study, 35691 pregnant women enrolled in the v safe system were selected, and all were aged 16 to 54 years [8].

The distribution of individuals was similar in terms of vaccine type (Pfizer or Moderna). These people were asked about the vaccine's side effects and reported pain at the injection site, headache, myalgia, chills, and fever more than any other symptom. There was more rate of injection site pain than in non-pregnant women [9].

Shengli Xia et al. designed a randomized, double-blind, and placebo-controlled study to investigate the immunogenicity and safety of the Sinopharm vaccine. The results obtained in phase 1 of this trial showed that 29% of vaccine recipients showed at least one side effect in the first seven days after injection. The most common symptoms were injection site pain and fever. Other common systemic symptoms after fever include fatigue, anorexia, and nausea. In phase 2 of the study, 23% of people who received the vaccine developed complications in the first seven days, and again in this phase, the most common complication was injection site pain, and the most common systemic symptom was fever [10].

In another study comparing the side effects of Sinopharm and Pfizer vaccines, 30.8% of people who received the first dose of the Sinopharm vaccine had side effects. Also, 17.7% had local symptoms, and 17.5% had systemic symptoms. Among those who received the second dose of the vaccine, 32.8% experienced at least one side effect, and in this group, 14.8% reported local symptoms, and 22% reported systemic symptoms [11].

In Saeed BQ et al. study, which was in the United Arab of Emirates, 24.4% of participants who injected the first dose of Sinopharm vaccine were asymptomatic, while the others complained of injection site pain (the most common), fatigue and headache. However, after the injection of the second dose, the frequency of symptoms was higher; only 14% were asymptomatic, and the most common symptoms were injection site pain (the most common), fatigue, lethargy, and headache [12].

By the beginning of vaccination in many countries, including this research study case (Iran), pregnant women, besides health care and elderlies, were a priority group to be vaccinated. This article aims to examine the results obtained from the condition of pregnant women after receiving one of the types of corona vaccines in Baharloo hospital in 2021. The only vaccine used for pregnant women in Iran was BBIBP-CorV (Sinopharm vaccine), the product of China National Pharmaceutical Group in China, which was one of the first COVID19 vaccines that completed the third phase of the clinical trial.

In this article, in addition to mothers' conditions (stage of reactions to the vaccines), this observation continued until the baby's birth, and weight and length of pregnancy were recorded. Also, the participants in this survey are divided into two groups who received one or every day during pregnancy. The data collection method and the Amara community have been discussed in the first part of this article. Then the results are presented in two tables according to the number of doses received and the condition of mothers and babies. Also, having a more accurate and clear comparison, these results have been compared in three graphs separated by dose and subject under investigation.

Method

After the availability of a suitable vaccine to deal with this epidemic, efforts were made to vaccinate people who are more at risk or weaker against the virus. Pregnant people were excluded from this group. However, there were many doubts due to insufficient information about the new vaccine's effects on fetuses and mothers. Regardless, the people who took the vaccine were subjected to strict controls, so this concept can be discussed with sufficient certainty. In Iran, only the Sinopharm vaccines were used for this group, and in this study, the mothers who went through the pregnancy-relevant checkups at Baharloo Hospital and decided to inject the vaccine were observed.

In the first phase of the study, based on the research results of the manufacturer's laboratory, a list of the most common side effects in pregnant women was extracted and analyzed. Based on the literature review, 19 symptoms after Sinopharm vaccination were emphasized, which are injection site pain, injection site redness or swelling, fever (temperature higher than 37.8), headache, vertigo, nausea and vomiting, abdominal pain, weakness, limb pain, sore throat, cough, itching, limb paresthesia, diarrhea, skin rash, rhinorrhea, visual defects, smell, and taste defect and decreased fetal movements. Patients were followed for 14 days after vaccination.

As the next step, the obtained results formed a chart with patient ID, phone number, past medical history of diabetes, hypertension, and covid19 infection during pregnancy, last menstruation period (LMP), expected date of confinement (EDC), and the date of their sonography in the first trimester to calculate their gestational age (GA). Then the date of vaccination and the symptoms mentioned above were in the following. The inclusion criteria for our study participants were pregnant women who did not get vaccinated before and were going to get the Sinopharm vaccine during pregnancy at any gestational age.

In this study, 175 pregnant women who visited the hospital for pregnancy care and wanted to receive the first dose of the Sinopharm vaccine were selected. This group was monitored for a 14-day period after the first and second dose injection, and they submitted a report of their condition daily to be examined in terms of the mentioned parameters.

Results

After determining the target group, collecting the relevant information, and analyzing, the results represented below are obtained. As can be seen in Table.1, the average age of participants was

Examining the Frequency of Complications Caused by Sinopharm Vaccine Injection in Pregnant Mothers Referred to Baharlo Hospital

30.65 ± 5.66, which ranged from 16 to 46. Sixteen participants (9.1%) only got the first dose, while the others (90.9%) injected two doses of Sinopharm. The mean gestational age for the first dose was 23w + 6 days (± 7w + 2.5d), and the minimum and maximum gestational age were 3w+1d and 39w+4d, respectively. For the second dose, the mean gestational age was 28w (± 6w + 3d) with a minimum of 8w and a maximum of 40w + 3d. Gestational diabetes mellitus was positive in 15 people (8.6%), and 2 (1.1%) participants had hypertension. Twenty-three women (13.1%) experienced COVID19 infection.

Analyzing obtained information showed that 81 of 175 (46.3%) pregnant women who injected the first dose of Sinopharm had at least one symptom, and the others (53.7%) were asymptomatic (p-value<0.0001). In addition, 45 of 159 (28.3%) people who had got the second dose of vaccine experienced at least one complication, and 114 (71.7%) participants were asymptomatic (p-value<0.0001). The frequency of each symptom for the first and second dose is presented in Table.2 and figure 1. Obtained results are summarized as follows: injection site pain 39.4% and 20% (P-value<0.0001), headache 5.7% and 3.4% (P-value=0.002), vertigo 4% and 1.1% (P-value=0.001), weakness 3.4% and 2.3% (P-value<0.0001), fever (body temperature higher than 37.8) 1.7% and 1.1% (P-value=0.83), myalgia or limb pain 1.1% and 0.6% (P-value=0.89), injection site redness or swelling 1.1% and 0.6% (P-value=0.18), nausea and vomiting 0.6% just for the first dose, diarrhea 1.1% just for the first dose, limb paresthesia 0.6% just for the second dose. The other symptoms (abdominal pain, sore throat, cough, itching, skin rash, rhinorrhea, visual defects, smell and taste defect, and fetal movements) were seen in neither group.

Table1 General information

Mean or Frequency (N=175)	Condition	Variable
30.65 ± 5.66 (16 - 46)	Mean ± SD of Age (min-max)	
23w + 6 days (± 7w + 2.5d) (3w+1d - 39w+4d)	First dose	Mean (± SD of gestational age) (min-max)

28w (\pm 6w+3d) (8w - 40w+3d)	Second dose	
159 - 90.9%	Injecting first and second dose during pregnancy	Vaccine injection (number - %)
16 - 9.1%	Not injecting the second dose during pregnancy	
160 - 91.4%	-	Diabetes (number - %)
15 - 8.6%	+	
173 - 98.9%	-	Hypertension (number - %)
2 - 1.1%	+	
152 - 86.9%	-	history of COVID19 infection (number - %)
23 - 13.1%	+	

Table 2 Frequency of vaccine side effects in the first and second doses

Variable	First dose		Second dose		P value
	Number	percentage	Number	percentage	
Side effects	81	46.3	45	28.3	0.000
Injection site pain	69	39.4	35	20	0.000
Headache	10	5.7	6	3.4	0.002
Vertigo	7	4	2	1.1	0.001
Weakness	6	3.4	4	2.3	0.000
Fever (higher than 37.8)	3	1.7	2	1.1	0.839
Injection site redness or swelling	2	1.1	1	0.6	0.185
Myalgia or limb pain	2	1.1	1	0.6	0.897
Diarrhea	2	1.1	0	0	-
Nausea and vomiting	1	0.6	0	0	-
Limb paresthesia	0	0	1	0.6	-
Abdominal pain	0	0	0	0	-
Sore throat	0	0	0	0	-
Cough	0	0	0	0	-
Itching	0	0	0	0	-
Skin rash	0	0	0	0	-
Rhinorrhea	0	0	0	0	-
Visual defects	0	0	0	0	-
Smell and taste defect	0	0	0	0	-
Fetal movements	0	0	0	0	-

For a more detailed examination of the symptoms after receiving each dose, Figure 2 shows the percentage of symptoms per day, and Figure 3 shows the same data after the second dose.

Figure 1 shows a comparison between the symptoms reported by the mothers after the first and second dose injections in percentage. As can be seen, the amount of symptoms after the injection of the second dose has decreased by about 30 to 50 compared to the first dose, which is exactly the expected result. Among the symptoms, injection site pain is reported in about 40% of patients after the first dose and 20% after the second dose, which is the most common symptom. The lowest number among the reported ones is related to limb pain and injection site redness and swelling. The changes in this category also follow a similar trend. Reported cases have decreased

from 1.1% (first dose) to 0.6% (second dose), which means a decrease of about 50%. Among all the symptoms, vertigo after the first dose was 3.5 times more after the first dose than the second dose, which has the largest decrease after infection site pain in this study.

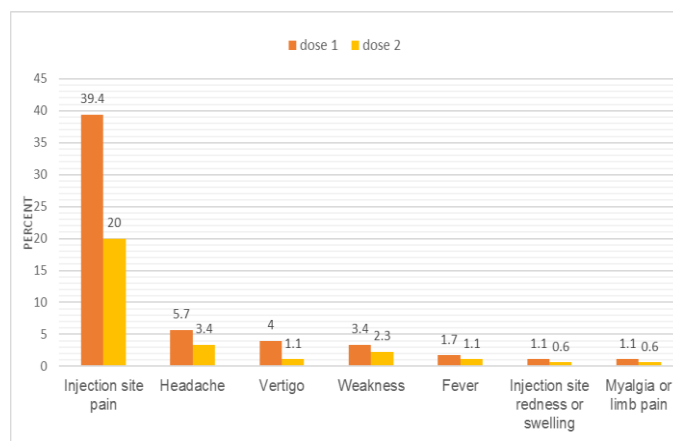


Figure 1 Percentage of common side effects after the first and second doses

In figures 2 and 3, the observation rate of 4 of the most common symptoms reported during the 14-day period is compared for the first and second dose, respectively. The compared items include injection site pain, headache, weakness, and vertigo, expressed in percentage. The most important difference that can be seen by comparing these two graphs is the end of each symptom, or in other words, the number of days that people have reported each symptom. In table 2, which is related to the first dose, even on the last day, the feeling of pain around the injection site was reported, and the other symptoms were resolved in the mothers after the ninth day. This case is completely different regarding the second dose, and the reporting rate of all symptoms after the fourth day has reached zero. If each case is compared separately, as mentioned earlier, the pain at the injection site was reported from the first to the last day of the reporting period, but in the second dose, it lasted until the fourth day. Headache has also been reported for up to 8 days for the first dose and up to 3 days for the second dose. Vertigo was recorded among candidates up to 2 days after the first injection and only on the first day after the second injection. Therefore, the duration of these three symptoms and the number of reports have decreased significantly after the second dose. However, it should be noted that, unlike the above three cases, the general trend is slightly different regarding fatigue. In addition to the fact that this symptom lasted longer in the second dose (2 days for the first dose and three days for the second dose), it also has the lowest reduction rate (3.4% for the first dose and 2.3% for the second dose).

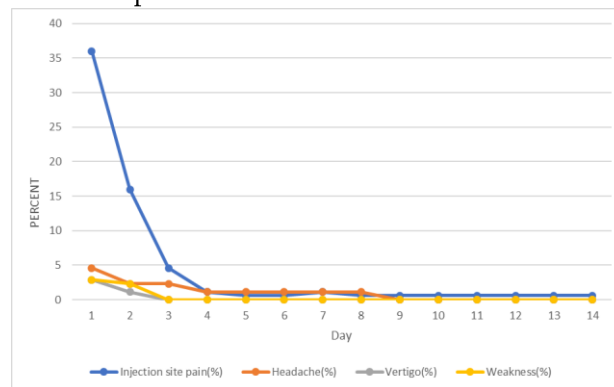


Figure 2 The reported percentage of each symptom after the first dose was injected

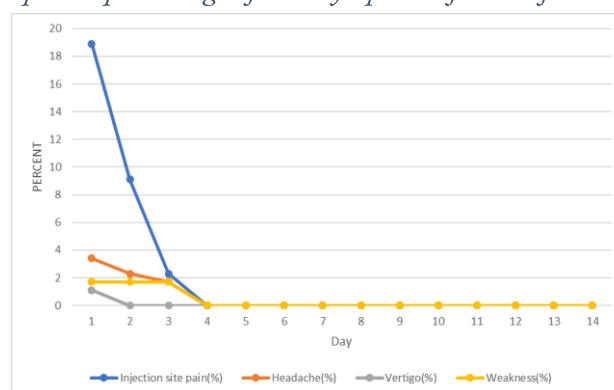


Figure 3 The reported percentage of each symptom after the second dose was injected

Conclusion

The health of pregnant women has always been an important concern due to factors such as hormonal and physical changes related to pregnancy and the strong dependence of the fetus's health on the mother's condition. For this reason, there are many strictures in prescribing medicine and vaccines for this group of society. However, the outbreak of the Covid-19 pandemic and the rapid development of a vaccine to prevent the growing spread led to insufficient research for investigating the side effects of produced vaccines on this group. Also, pregnant women were excluded from the conducted research because of their vulnerability and minimization of possible risks. Nevertheless, despite the possible risks, pregnant women were among the first groups prioritized for vaccination because they had a weaker immune system and a more sensitive state of health. In this research, a group containing 175 pregnant women between the ages of 16 and 46 were monitored by daily telephone interviews for 14 days after the injection of the Sinopharm vaccine. About 13% of the studied population had a history of corona infection, about 90% injected each dose during pregnancy, and 10% only injected the first dose during this period. They were asked to report the observation of 19 side effects after the injection, and eventually, fetal movement, length of pregnancy, and the newborn's condition were recorded. Among them, nine symptoms were reported after the first dose and eight symptoms after the second dose. The most reported symptom was pain at the injection site; its number did not reach zero after the first dose

injection until the end of the study period. The average gestational age for those who injected both doses was 28 weeks, and for the other group, it was 24 weeks.

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