



Screening of COVID-19 polymerase chain reaction tests using saliva for pregnant women and their partners in Himeji city

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Abstract

A screening of coronavirus disease 2019 (COVID-19) polymerase chain reaction (PCR) tests using saliva for pregnant women and their partners was performed at all 12 maternity facilities located in Himeji city between May 29 and September 5, 2020. Pregnant women at 37 or more weeks of gestation or who experienced threatened labor and their partners who cared for an infant underwent a saliva PCR test with informed consent. As a result, all of 1475 pregnant women and 1343 partners tested negative for COVID-19 PCR. There were no cases of false positive or false negative PCR tests. This cohort study revealed for the first time that a screening of COVID-19 PCR tests using saliva may be useful to sustain perinatal medical care during the pandemic period in Japan.

Key words: COVID-19, Himeji city, pregnancy, saliva PCR, SARS-CoV-2, screening.

Reports

Since its discovery in Wuhan, China, in late 2019, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has rapidly created a global pandemic of novel coronavirus disease 2019 (COVID-19).

Under a new project titled 'Future Protection for Himeji against COVID-19,' a screening of COVID-19 polymerase chain reaction (PCR) tests using saliva for pregnant women and their partners was performed at all 12 maternity facilities, including 4 hospitals, 7 clinics and 1 midwifery home, in Himeji city. In this cohort study, pregnant women at 37 or more weeks of gestation or who experienced threatened labor and their partners who cared for an infant underwent a saliva PCR test with informed consent.

Between May 29, 2020, and September 5, 2020, 1475 pregnant women, 1189 male partners and 154 female partners collected their saliva in a container during the morning at home, and the pregnant women submitted the container to hospitals. During this period, 1680 pregnant women were offered a screening of COVID-19 PCR tests using saliva, and 1475 (87.8%) pregnant women underwent the tests with informed consent. The remaining 205 pregnant women were not tested because 108 (6.4%) did not consent, and 97 (5.8%) delivered before the PCR test could be done. None of the pregnant women had symptoms of COVID-19. Reverse transcription-polymerase chain reaction (RT-PCR) tests for COVID-19 were performed at Hyogo Clinical Laboratory, according to the manual for the detection of pathogen 2019-nCoV Ver.2.6.¹ Table 1 shows the residential areas of

Received: November 15 2020.

Accepted: November 27 2020.

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Table 1 Number of PCR tests according to residential area

		Pregnant women		Male partner		Female partner		Total	
Himeji city		936		842		114		1,892	
Neighboring area in Hyogo prefecture	North Harima	21	323	19	273	9	33	49	629
	East Harima	52		40		2		94	
	Middle Harima	63		57		10		130	
	West Harima	187		157		12		356	
Non-neighboring area in Hyogo prefecture	Kobe	33	73	17	43		7	50	123
	Hanshin	29		17		0		46	
	Tajima	11		9		7		27	
	Tamba	0		0		0		0	
	Awaji	0		0		0		0	
Outside Hyogo prefecture		143		31		0		174	
Total		1,475		1,189		154		2,818	

PCR, polymerase chain reaction.

pregnant women and their partners who underwent the saliva PCR tests. Of the 1475 pregnant women, 936 (63.5%) lived in Himeji city, Hyogo prefecture; 396 (26.8%) lived in Hyogo prefecture outside Himeji city; and the remaining 143 (9.7%) lived outside Hyogo prefecture.

Medical staff in the 12 maternity facilities used standard precautions with personal protective equipment (PPE) including gloves, standard gown or apron, surgical mask, and goggle or face shield during labor for women without symptoms of COVID-19. Pregnant women were asked to use surgical masks during labor in 8 facilities, but many removed their masks during labor. Partners were permitted to attend the birth in 11 facilities.

Results showed all of 1475 pregnant women and 1343 partners tested negative for COVID-19 PCR using saliva. Contrary to expectations, there were no cases of false positive or false negative PCR tests. This suggests that a screening of saliva PCR tests is a reliable method to detect patients who have COVID-19. The population of Himeji city was 529 216 on June 1, 2020. During the study period, 74 patients (0.014%) had positive PCR tests for COVID-19, although no health care workers in the 12 maternity facilities had positive PCR tests. The screening of COVID-19 PCR tests using saliva may have given a sense of security to pregnant women and their partners living in Himeji city. Additionally, perinatal medical care was sustained without collapse of the healthcare system during the COVID-19 pandemic. Therefore, the screening of COVID-19 PCR tests using saliva with informed consent may be useful methods to sustain

perinatal medical care during the pandemic period in Japan.

A prospective cohort study universally tested pregnant women admitted for delivery in New York City for COVID-19 PCR using a nasopharyngeal swab. This study found that 10.4% of 675 women were positive for COVID-19, of whom 78.6% were asymptomatic.² The Japan Association of Obstetricians and Gynecologists performed a questionnaire survey to investigate COVID-19 prevalence in maternity hospitals in Japan. Between January 2020 and June 2020, 72 pregnant women tested positive for COVID-19 and the prevalence rate was calculated at 0.02% (72/ 305 722 deliveries). A similar positive prevalence rate of 0.03% (2/ 7428 pregnant women) was also found on universal screening of COVID-19 PCR tests for asymptomatic pregnant women.³ In the present cohort study, the number of pregnant women screened was relatively small, and there were no false positive PCR tests. These may be reasons why none of the 1475 asymptomatic pregnant women tested positive for saliva COVID-19 PCR in Himeji city.

A recent mass-screening study of COVID-19 in asymptomatic persons revealed the sensitivity of PCR tests using nasopharyngeal and saliva specimens were 86% and 92%, respectively, with specificities greater than 99.9%, suggesting both nasopharyngeal and saliva specimens have high sensitivity and specificity. Self-collected saliva is likely a valuable specimen to detect COVID-19 in universal screening of asymptomatic pregnant women.⁴

To the best of our knowledge, the present cohort study revealed for the first time that a screening of

COVID-19 PCR tests using saliva among asymptomatic pregnant women and their partners may be useful to sustain perinatal medical care during the pandemic period in Japan.

Acknowledgments

This work was supported by the Ministry of Health, Labour and Welfare of Japan (Grant Number 20CA2033).

Disclosure

None declared.

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