

# The physical and mental burden on obstetricians and gynecologists during the COVID-19 pandemic: A September 2020 questionnaire study

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## Abstract

**Aim:** The aim of this study was to clarify the physical and mental burden of the COVID-19 pandemic on obstetricians and gynecologists in Japan and to identify factors that increase the burden of their psychological stress.

**Methods:** A web-based questionnaire was sent to obstetricians and gynecologists in Japan via email and social media to collect voluntary responses. This survey was conducted from September 1 to 30, 2020.

**Results:** A total of 852 valid responses were included in the analysis; 76% (644) of the physicians felt that the COVID-19 pandemic caused them physical and mental stress equal to or greater than the most severe disaster they had ever experienced. Physicians who reported high mental and physical stress were more likely to be in areas with high numbers of infected patients (odds ratio (OR) 1.571,  $p = 0.012$ ). Physicians experienced great stress to the point of wearing heavy personal protective equipment during routine vaginal deliveries by mothers with no COVID-19 symptoms. This trend was markedly pronounced for physicians working in regions with fewer cases of COVID-19 infection.

**Conclusions:** Obstetricians and gynecologists who reported high mental and physical stress were more likely to be in areas with high numbers of infected patients. One potential reason for this may be that they were required to wear more personal protective equipment than necessary. Infection control methods that ensure the safety of obstetricians and gynecologists while not causing unnecessary physical or psychological stress are needed.

**Key words:** COVID-19, mental burden, questionnaire study.

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## Introduction

The novel coronavirus infection (COVID-19), which started in December 2019, caused a pandemic and resulted in a medical resource shortage in Japan, as well as the rest of the world.<sup>1,2</sup> In addition to overburdening the healthcare system, the psychological burden on doctors, nurses, and comedical workers in the medical field was also extremely high.<sup>3</sup>

According to a report from China in January–February 2020 during the early stages of the COVID-19 pandemic, 50% of healthcare workers in treatment settings suffered from depression, and more than 70% suffered from psychological distress.<sup>3</sup> Healthcare workers are at a relatively high risk of depression, anxiety, distress, and insomnia compared to other professionals.<sup>4</sup> Sutton et al. reported that 87.9% of mothers who tested positive for COVID-19 at the time of delivery were asymptomatic,<sup>5</sup> and this places a large psychological burden on obstetricians, gynecologists, and midwives who attend deliveries in high-aerosol environments. However, to date, no studies on the psychological burden of the COVID-19 pandemic have focused specifically on obstetricians and gynecologists.

The Infectious Disease Subcommittee of the Perinatal Committee of the Japanese Society of Obstetrics and Gynecology conducted this study to document the stress caused by COVID-19 countermeasures experienced by obstetricians and gynecologists, as well as to clarify the factors causing stress for obstetricians and gynecologists during the COVID-19 pandemic, which is expected to continue for an extended period.

## Methods

### Study design and sampling

This study used a snowball sampling technique via the Japanese Society of Obstetrics and Gynecology mailing list, the NICU Liaison Council mailing list, and social media to collect data from a wide range of obstetricians and gynecologists who voluntarily responded to the questionnaire. A questionnaire website and database were created by a company using Survey Monkey, which is a questionnaire-creating computer program. The survey was conducted between September 1 and 30, 2020, just after the second wave of COVID-19 infections in Japan.

This study was approved by the Yokohama City University Hospital Ethics Committee (No. B200800046).

### Questionnaire contents

The questionnaire included the following items:

1. Region and attributes of the physician's institution,
2. Number of hospital beds and deliveries per year at the physician's institution,
3. Admittance of infected patients at their institution,
4. Personal protective equipment worn by physicians during normal delivery,
5. Opinion on the delivery procedures for asymptomatic infected patients,
6. Opinion on the separation of asymptomatic infected mothers and their infants,
7. Opinion on screening all pregnant women for COVID-19 before delivery,
8. Opinion on returning to their parents' town to deliver, and
9. If the physical and mental burden of the most serious disaster you experienced in the past was rated as 3, how would you rate the physical and mental burden of the COVID-19 pandemic on a scale from 1 to 5, 1 being the lowest burden, and 5 being the highest burden?

### Comparison with pregnant women

A web-based questionnaire survey of pregnant women and postpartum mothers was also conducted using the system outlined above.<sup>6</sup> The data from 4794 pregnant women were analyzed and compared with the data obtained in the present study.

### Statistical analyses

The number and proportion are presented for each variable included in the work-related factors, hospital environments, COVID-19 pandemic factors, and the physical and mental burdens on obstetricians, gynecologists, and pregnant women. To compare categories of variables between obstetricians, gynecologists, and pregnant women, the chi-square test was conducted. Univariate and multivariate analyses using logistic regression models were performed to identify COVID-19 pandemic factors contributing to a high burden on obstetricians and gynecologists. Crude and adjusted odds ratios with 95% confidence intervals are presented. The confounding factors included in the work-related factors and hospital environments were adjusted for.

**TABLE 1** Characteristics of obstetricians and gynecologists ( $n = 852$ )

Variables	$n$ (%)
Length of practice (years)	
≤5	79 (9.3)
6–10	116 (13.6)
11–20	261 (30.6)
21–30	219 (25.7)
31 or more	176 (20.7)
NA	1 (0.1)
Affiliated facility	
Perinatal maternal and child care center	402 (47.2)
General hospital	235 (27.6)
Obstetric hospital	163 (19.1)
NA	52 (6.1)
Number of hospital beds of the affiliated facility	
0	56 (6.6)
<20	120 (14.1)
20–100	69 (8.1)
100–300	66 (7.7)
300–999	478 (56.1)
1000 or more	59 (6.9)
NA	4 (0.5)
Number of deliveries per year	
0	59 (6.9)
≤500	425 (49.9)
>500	368 (43.2)

Abbreviation: NA, not available.

All statistical analyses were conducted using an assumed Type I error rate of 0.05 for two-tailed tests using IBM SPSS Statistics 26.0 (IBM SPSS, Inc.).

## Results

The present survey yielded 852 valid responses from 854 obstetricians and gynecologists. The details of the responding obstetricians and gynecologists are listed in Table 1. Among clinicians, 456 (54%) had been in practice for 20 years or less, 176 (21%) were clinicians at institutions with fewer than 20 beds, 537 (63%) had more than 300 beds at their facility, and 368 (43%) were physicians at facilities with more than 500 deliveries per year.

### Comparison of factors concerning COVID-19 between obstetricians/gynecologists and pregnant women

Based on the infection statistics for Japan in September 2020, we focused on areas with more than 4.8 infected per 10 000 people and areas with less infection (less than 4.8 infected per 10 000 people) (Table 2). Forty-eight percent (410) of the physicians

and 52% (2493) of pregnant women lived in areas with high infection rates ( $p = 0.037$ ). Sixty-two percent (489) of the physicians reported that predelivery screening was conducted at their facilities, but only 30% (251) believed that universal screening was necessary. In contrast, 12% (582) of pregnant women attended facilities offered prepartum screening tests, but 69% (3278) felt that universal screening tests were necessary ( $p < 0.001$ ). For patients with asymptomatic infections, both physicians and pregnant women responded that cesarean section was the preferred mode of delivery. Forty-three percent (355) of physicians and 35% (1653) of pregnant women favored the separation of infected mothers and children after birth, with pregnant women being less inclined than clinicians to support the separation of a mother and her child ( $p = 0.001$ ). Eighty-six percent (729) of doctors were in favor of returning to their parents' town for delivery, despite the social climate in the midst of the COVID-19 pandemic. Seventy-six percent (644) of the physicians and 48% (2303) of pregnant women felt that the COVID-19 pandemic caused them physical and mental stress equal to or greater than the most severe disaster they had ever experienced. Doctors experienced more severe mental burden than pregnant women ( $p < 0.001$ ).

### The relationship between physical/mental burden among obstetricians/gynecologists and working environment

According to the baseline established by indicating that the most serious disaster a participant had experienced in the past was set at 3 on a scale of 1–5 (see above), the number of doctors who felt a strong mental and physical burden of 4 or 5 due to the COVID-19 pandemic was associated with a higher number of infected patients in their region (odds ratio (OR) 1.453,  $p = 0.021$ ) (Tables 3 and 4). Acceptance or refusal of infected patients by their respective facilities or whether their facility screened pregnant women before delivery were not related to the mental burden on doctors. Alternatively, the type of personal protective equipment worn during delivery affected the mental and physical burden on doctors ( $p = 0.007$ ) (Table 3). In addition, when examining personal protective equipment during normal vaginal delivery for asymptomatic (healthy) mothers, physicians who wore heavier personal protective equipment, such as N95 masks, experienced greater physical and mental burden than those who wore only gloves and surgical masks (Table 4).

**TABLE 2** Comparison of factors concerning COVID-19 between obstetricians/gynecologists and pregnant women

	Gynecologists	Pregnant women	<i>p</i> value <sup>a</sup>
	<i>n</i> (%)	<i>n</i> (%)	
Number	852	4794	
COVID-19 patients in the prefecture			
Low epidemic	442 (51.9)	2301 (48.0)	0.037
High epidemic	410 (48.1)	2493 (52.0)	
Status of predelivery COVID-19 screening at their facility			
Yes	489 (61.8)	582 (12.3)	<0.001
No	302 (38.2)	4136 (87.7)	
Opinions of universal screening on COVID-19			
Necessary	251 (30.1)	3278 (69.4)	<0.001
Unnecessary	582 (69.9)	1446 (30.6)	
Appropriate delivery mode for asymptomatic infections			
Cesarean section	422 (52.6)	2499 (56.9)	0.024
Vaginal delivery	380 (47.4)	1891 (43.1)	
Mother–infant separation for asymptomatic infections			
Yes	355 (43.2)	1653 (34.9)	0.001
No	466 (56.8)	3085 (65.1)	
Opinion on returning to their parents' town for delivery <sup>b</sup>			
Acceptable without any restrictions	305 (36.0)		
Acceptable with some restrictions	424 (50.0)		
Not acceptable	119 (14.0)		
Burden due to COVID-19			
1 (small)	45 (5.3)	810(16.9)	
2	163 (19.1)	1681 (35.1)	
3	204 (23.9)	748 (15.6)	<0.001
4	275 (32.3)	934 (19.5)	
5 (great)	165 (19.4)	621 (13.0)	

Note: Low epidemic and high epidemic indicate <4.80 COVID-19 patients and ≥4.80 COVID-19 patients per 10 000 population, respectively.; <sup>a</sup>Chi-squared test used. and <sup>b</sup>Missing values were excluded.

### The relationship between physical/mental burden on obstetricians/gynecologists and their work environment, categorized according to number of infected patients in their region

In both regions with fewer and larger numbers of infected, the heavier the equipment used by doctors during normal vaginal delivery in asymptomatic (healthy) mothers, the greater the physical and mental burden on the physician (Table 5).

## Discussion

This is the first study to investigate the physical and mental burden on obstetricians and gynecologists during the COVID-19 pandemic. The results of the present study suggest that obstetricians and gynecologists experienced greater physical and mental burdens than pregnant women, and this tendency was stronger for physicians in regions with higher numbers of infected patients; second, excessive personal

protective equipment may be one of the causes of this physical and mental burden.

First, obstetricians and gynecologists felt greater physical and mental burdens than pregnant women, and this tendency was stronger for physicians in regions with a high number of infected patients. There have been reports on the psychological burden of the COVID-19 pandemic on pregnant women, and depression among pregnant women has increased during the pandemic.<sup>7</sup> However, our results revealed that obstetricians and gynecologists are under even more physical and mental stress than pregnant women. As of September 2020, the supply of personal protective equipment in Japan had been reestablished. Although the overwhelming shortage of personal protective equipment has been remedied, that the effects of the previous, continuous stress, which accumulated for 6 months since the start of the COVID-19 pandemic, likely contributed to these clinicians' increased physical and mental burdens. Psychological stress is related to physical health; over half of all medical professionals have reported a decrease in their health

**TABLE 3** Relationship between physical/mental burden among obstetricians/gynecologists and working environment

	Total	Low burden (≤3 points)	High burden (>3 points)	<i>p</i> value <sup>a</sup>
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
COVID-19 patients in the prefecture				
Low epidemic	442 (51.9)	233 (52.7)	209 (47.3)	0.008
High epidemic	410 (48.1)	179 (43.7)	231 (56.3)	
Infected patients receiving facility services				
Yes	514 (60.5)	250 (48.6)	264 (51.4)	0.837
No	336 (39.5)	161 (47.9)	175 (52.1)	
Infected pregnant women receiving facility services <sup>b</sup>				
Yes	243 (28.7)	110 (45.3)	133 (54.7)	0.293
No	605 (71.3)	298 (49.3)	307 (50.7)	
Predelivery COVID-19 screening at the facility <sup>b</sup>				
Yes	489 (61.8)	228 (46.6)	261 (53.4)	0.270
No	302 (38.2)	153 (50.7)	149 (49.3)	
Rate of mother–child separation due to COVID-19 <sup>b</sup>				
Increased	127 (16.4)	55 (43.3)	72 (56.7)	0.456
Not changed	661 (83.1)	318 (49.5)	336 (50.5)	
Decreased	4 (0.5)	3 (7.5)	1 (25.0)	
Type of personal protective equipment used during delivery without symptoms of COVID-19 <sup>b</sup>				
Gloves	8 (1.0)	3 (37.5)	5 (62.5)	0.007
Gloves, surgical mask	117 (14.9)	73 (62.4)	44 (37.6)	
Gloves, surgical mask, eye shield	76 (9.7)	40 (52.6)	36 (47.4)	
Gloves, surgical mask, eye shield, gown	441 (56.0)	205 (46.5)	236 (53.3)	
Gloves, surgical mask, eye shield, gown, cap, shoe cover	119 (15.1)	54 (45.4)	65 (54.6)	
Gloves, N95 mask, eye shield, gown, cap, shoe cover	26 (3.3)	7 (26.9)	19 (73.1)	

Note: Low epidemic and high epidemic indicate <4.80 COVID-19 patients and ≥4.80 COVID-19 patients per 10 000 population, respectively.; <sup>a</sup>Chi-squared test used. and <sup>b</sup>Missing values were excluded.

during the COVID-19 pandemic.<sup>8</sup> It is important to be aware that obstetricians and gynecologists experience an even greater physical and mental burden than pregnant women.

Second, our results suggest that wearing heavy personal protective equipment may increase physical and mental stress. It is clear that the lack of personal protective equipment and the shortage of COVID-19 PCR tests that started in March 2020 contributed to a long period of anxiety as well as mental and physical stress in medical workplaces.<sup>9</sup> However, when the supply of personal protective equipment was restored, physicians began wearing excessive personal protective equipment when attending deliveries of women who were asymptomatic for COVID-19. Additionally, some institutions may have initiated various other excessive restrictions. Given our observation of the negative effects of excessive personal protective equipment use on medical staff, it may be necessary to select moderate personal protective equipment to avoid unnecessary burden.

Despite the fact that the problem of false negatives from COVID-19 PCR tests<sup>10</sup> remains unresolved,

requiring excessive use of personal protective equipment will increase the physical and mental burden on frontline medical workers. N95 masks get “stuffy” when worn for extended periods, eye shields limit vision due to fogging, and gowns are burdensome due to their moisture and heat retaining properties. Thus, resolution of these issues would be one means by which excess stress experienced by medical professionals could be reduced. While it is difficult to determine what “excessive personal protective equipment” entails, maximizing protection of the eyes and nasopharynx, which are the main routes of infection, and reducing the use of other protective measures is warranted.

One of the limitations of the present study is that it entailed a snowball sampling technique, as such, the data are not representative of each institution and are biased toward the opinions of obstetricians and gynecologists who proactively responded to the questionnaire. Additionally, 852 respondents in total were included in the analysis, which accounts for only 5% of the 16 885 members of the Japanese Society of Obstetrics and Gynecology. Therefore, generalization

**TABLE 4** Odds ratios for physical/mental burden among obstetricians and gynecologists due to working environment

Variables <sup>b</sup>	Univariate analysis			Multivariable analysis		
	cOR	95% CI	<i>p</i> vaule <sup>a</sup>	aOR	95% CI	<i>p</i> vaule <sup>a</sup>
COVID-19 patients in the prefecture, high versus low	1.439	1.098–1.885	0.008	1.453	1.058–1.996	0.021
Infected patients receiving facility services (yes vs. no)	0.972	0.738–1.279	0.873	1.355	0.866–2.122	0.184
Infected pregnant women receiving facility services (yes vs. no)	1.174	0.871–1.582	0.293	0.998	0.694–1.433	0.990
Predelivery COVID-19 screening at their facility (yes vs. no)	1.175	0.882–1.566	0.270	1.159	0.850–1.581	0.352
Separation of mother and child due to COVID-19 (increased vs. not changed and decreased)	1.289	0.879–1.891	0.194	1.289	0.855–1.944	0.225
Type of personal protective equipment used during delivery without symptoms of COVID-19						
Gloves	2.765	0.063–12.140	0.178	2.855	0.631–12.915	0.173
Gloves, surgical mask	Ref.			Ref.		
Gloves, surgical mask, eye shield	1.493	0.832–2.681	0.179	1.265	0.685–2.334	0.452
Gloves, surgical mask, eye shield, gown	1.910	1.257–2.902	0.002	1.858	1.197–2.884	0.006
Gloves, surgical mask, eye shield, gown, cap, shoe cover	1.997	1.188–3.358	0.009	1.985	1.153–3.419	0.013
Gloves, N95 mask, eye shield, gown, cap, shoe cover	4.503	1.752–11.573	0.002	4.663	1.731–12.561	0.002

Note: Low epidemic and high epidemic indicate <4.80 COVID-19 patients and ≥4.80 COVID-19 patients per 10 000 population, respectively.; Abbreviations: 95% CI, 95% confidence interval; aOR, adjusted odds ratio; cOR, crude odds ratio.; <sup>a</sup>Using the logistic regression model adjustment after characteristics of gynecologist. and <sup>b</sup>Missing values were excluded.

of the results of this study to other populations should be made with caution. Another limitation of the present study is that we did not use an anxiety scale that objectively measures mental and physical stress.

For the provision of sustainable perinatal care as the COVID-19 pandemic continues in the long term, it is necessary to recognize that obstetricians and gynecologists feel a greater physical and mental burden than pregnant women and that one reason for this is

**TABLE 5** Relationship between physical/mental burden on obstetricians/gynecologists and their work environment, categorized according to number of infected patients in their region

Variables <sup>b</sup>	Low infected			High infected		
	aOR	95% CI	<i>p</i> vaule <sup>a</sup>	aOR	95% CI	<i>p</i> vaule <sup>a</sup>
Infected patients receiving facility services (yes vs. no)	1.419	0.763–2.639	0.269	1.406	0.713–2.774	0.326
Infected pregnant women receiving facility services (yes vs. no)	1.183	0.691–2.025	0.540	0.951	0.578–1.565	0.843
Predelivery COVID-19 screening at their facility (yes vs. no)	0.961	0.635–1.454	0.852	1.400	0.865–2.268	0.171
Type of personal protective equipment used during delivery without symptoms of COVID-19						
Gloves	3.127	0.510–19.190	0.218	1.658	0.092–29.930	0.732
Gloves, surgical mask	Ref.			Ref.		
Gloves, surgical mask, eye shield	1.725	0.743–4.005	0.204	1.225	0.483–3.104	0.669
Gloves, surgical mask, eye shield, gown	2.012	1.160–3.489	0.013	2.102	0.994–4.443	0.052
Gloves, surgical mask, eye shield, gown, cap, shoe cover	1.867	0.925–3.770	0.081	2.941	1.193–7.253	0.019
Gloves, N95 mask, eye shield, gown, cap, shoe cover	6.225	1.298–29.850	0.022	5.869	1.478–23.307	0.012

Note: Low epidemic and high epidemic indicate <4.80 COVID-19 patients and ≥4.80 COVID-19 patients per 10 000 population, respectively.; Abbreviations: 95%CI, 95% confidence interval; aOR, adjusted odds ratio.; <sup>a</sup>Using the logistic regression model adjustment after characteristics of gynecologist. and <sup>b</sup>Missing values were excluded.

the requirement to wear more personal protective equipment than may be necessary. We must continue to search for infection control methods to keep obstetricians and gynecologists safe, but not exhaust them.

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## Conflict of Interest

The authors declare no potential conflict of interest.

## Author Contributions

All authors, Takeshi Umazume, Etsuko Miyagi, Yasuo Haruyama, Soichiro Obata, Gen Kobashi, Kentaro Kurasawa, Yukio Suzuki, Tomoaki Ikeda, Tadashi Kimura, and Hideto Yamada, participated in the design of the study and collected data from doctors that participated in this study. Takeshi Umazume and Etsuko Miyagi drafted the manuscript. Yukio Suzuki performed statistical analyses. Hideto Yamada conceived of the study and helped to draft the manuscript.

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