



Barrier measures implemented in French maternity hospitals during the COVID-19 pandemic: A cross-sectional survey

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ABSTRACT

Objectives: The objectives of this survey were 1) to describe the changes over time of barrier measures in maternity units, specifically, co-parent visits and women wearing masks in birth rooms, and 2) to identify potential institutional determinants of these barrier measures.

Design: We used an online questionnaire to conduct a descriptive cross-sectional survey from May to July 2021.

Setting: All districts in mainland France.

Participants: Midwife supervisor of each maternity unit.

Measurements: Primary outcomes were “banning of visits” in the postnatal department during the first lockdown (March–May 2020), and “mandated mask-wearing in birth rooms” during the survey period (May–July 2021); the independent variables were maternity unit characteristics and location in a crisis area. Co-parent visits were considered only during the first lockdown as they were mostly allowed afterwards, and the wearing of masks was studied only during the survey period, as masks were unavailable for the population during the first lockdown.

Results: We obtained 343 responses, i.e., 75.2% of French maternity units. Visits to the postnatal department were forbidden in 39.3% of the maternity units during the first lockdown and in none during the study period. Maternity hospitals with neonatal intensive care units were the most likely to ban co-parent hospital visits (adjusted OR 2.34 [1.12; 4.96]). However, those were the maternity units least likely to encourage or require women to wear masks while pushing (adjusted OR, 0.31; 95% confidence interval [CI], 0.11–0.77). Maternity units in crisis areas (i.e., with very high case counts) during the first lockdown banned visits significantly more often (adjusted OR, 1.68; 95% CI, 1.05–2.70).

Key conclusions: Our study showed that barrier measures evolved during the course of the pandemic but remained extremely variable between facilities.

Implications for practice: Maternity units implemented drastic barrier measures at the beginning of the pandemic but were able to adapt these measures over time. It is now time to learn from this experience to ensure that women and infants are no longer harmed by these measures.

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Introduction

In early 2020, a novel virus acting differently from most known viruses and later named SARS-CoV2, set off the COVID-19 pan-

demic. It spread rapidly around the world much faster than knowledge developed about the virus and its impact on pregnant women, especially women in labor, and newborns (WHO, 2020). This pandemic required general societal responses, such as lockdowns, but also the reorganization of care to ensure the safety of both patients and staff. Because its novelty meant that the relevant evidence in the literature was sparse, responses led to heterogeneous practices, most considering pregnant women to be especially vulnerable (Ioannidis, 2019; Bick et al., 2020). Thus, the activities of

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some community midwives had to be postponed or cancelled, with teleconsultation the principal alternative for providing continuity of care (Baumann et al., 2021; Gaucher et al., 2022; Rousseau et al., 2022). Midwives' hospital activities also had to adapt to the lack of clear recommendations by changing their organization in ways that affected the visits of co-parents or other support for women during labor (Coxon et al., 2020; Bradfield et al., 2021; Kotlar et al., 2021). In most countries, measures allowed a single asymptomatic support person in the delivery room, shortened the length of stay in maternity units, and required the wearing of masks by Staff only (Narang et al., 2020). These different measures probably aggravated the psychological effects of the pandemic on women. Many studies during the pandemic period showed substantial proportions of women with post-traumatic stress disorder following childbirth (PTSD-FC), anxiety or depression, and loneliness (Liu et al., 2020; Barbosa-Leiker et al., 2021; Basu et al., 2021; Wyszynski et al., 2021). This impaired psychological state was linked to fear of the virus and the isolation of lockdown, but also to lack of support during pregnancy and the absence of visits and support during hospitalization (Kinser et al., 2022).

In France, obstetricians were the first health professionals to publish recommendations requiring women giving birth to wear a mask, even while pushing, and refusing to allow them to be accompanied by partners or other support with suspected or confirmed COVID-19 (Peyronnet et al., 2020). These proposals, made without interprofessional consensus, were very quickly relayed on social networks where they became the object of debates and polemics.

A year after the pandemic started, with greater knowledge about the risks for pregnant women and an available vaccine, we sought to examine how maternity units were organised to ensure women's physical and emotional safety. As the controversy between the professional organisations of obstetricians (CNGOF) and midwives (CNSF) persisted in France about parturients wearing masks in the birth room, we aimed to ask and thus document what rules maternity units imposed and how they changed their implementation of barrier measures such as this specific mask requirement and allowing visits by co-parents.

The objectives of the study were 1) to describe the evolution of barrier measures in maternity units, i.e., co-parent visits and mask-wearing in birth rooms, and 2) to identify potential institutional determinants of these measures.

Methods

This descriptive cross-sectional survey took place from May 17–July 30, 2021 (the study period) by an online questionnaire. To document the practices of each of the 456 French maternity units, we sought to include all midwifery supervisors of maternity units in this survey. This quantitative study followed the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) to report our data (Eysenbach, 2004).

Screening and recruitment

An e-mail containing the link to the survey was sent to midwifery supervisors via the French Federation of Perinatal Health Networks (*Fédération Française des Réseaux de Santé en Périnatalité*), which is in contact with all French maternity units, public and private. Only one response was expected per maternity unit; if more were received, we analysed the most complete one. All maternity units that did not participate were contacted by telephone to resend the survey link to the midwifery supervisor or to complete the survey by phone with him/her. No incentive or reward was offered for participation; supervisors were free to decide for themselves.

Survey instrument

The questionnaire was developed by the co-authors and was pretested with midwives to verify the clarity of the questions and wording. The questionnaire was available via the secure software LimeSurvey platform.

The self-administered questionnaire consisted of 3 parts with multiple-choice questions (and single-choice responses), always in the same order:

- 1) The characteristics of the maternity unit: status (classified as university public, other public, or private hospital), level of neonatal care (Level 1, no neonatal unit; Level 2, with a neonatal care unit; Level 3, with a neonatal intensive care unit), number of births per year (< 1500/year, 1500–2499/year, ≥ 2500/year), and postal code.

The names of the maternity units were recorded to verify that each maternity unit participated only once. However, the database was processed globally and anonymously. The postal code allowed us to determine if the maternity unit was located in a crisis area. During the first lockdown (March 17–May 11, 2020), crisis areas were defined as districts with a ratio of more than 2 deaths per 100,000 residents on March 23, 2020, according to Santé Publique France (Santé Publique France, 2020). During the survey period (May–July 2021), crisis areas were defined as districts with incidence rates above 50 per 100,000 residents on June 17, 2021, again according to Santé Publique France (Santé Publique France, 2020).

- 2) Data concerning access to visits by the co-parent in the different maternity departments: prenatal hospitalization department, emergency department, birth room, postnatal department, and neonatology department (if any).

For the first lockdown period in France and for the survey period the next year, midwifery supervisors were asked to answer the following question: "Please describe the rules for the co-parent's presence in the different departments of your maternity unit?" The possible answers were: "visits not allowed", "visits allowed, only at specific times", "visits allowed on a case-by-case basis", "unlimited visits allowed", or "no such department in the maternity unit".

- 3) Data concerning mask-wearing by parturients in the birth room.

Midwifery supervisors answered additional questions for the survey period: "Is there systematic information about parturients wearing a mask in the birth room?" (Yes or No) and "What instructions are given to women about the use of masks in the birth room?" during labor and while pushing. One of the following responses had to be chosen: "You are allowed to take the mask off", "you are encouraged to wear the mask", "you are required to wear the mask", and "no instruction was given". This question was asked only during the survey period because masks could not be required during the first lockdown, given the unavailability of masks for the general public at that time.

All questionnaires with complete answers for part 1 – the maternity unit characteristics – were included.

Statistical analysis

Qualitative (categorical) variables were described with numbers and percentages, and their proportions compared with the Chi-2 or Fisher's exact test, as appropriate. The answers concerning the first lockdown period (March–May 2020) and those concerning the survey period (May–July 2021) were compared with the Mc Nemar test for matched percentages.

For the determinant analysis, primary outcomes were 1) "no visits allowed" in the postnatal department during the first lockdown.

Table 1
Characteristics of maternity units.

		Respondents N = 343 n (column %)	Non-respondents N = 115 n (column %)	p**
Status	Public university hospital	40 (11.7)	0	<0.001
	Public, non-university*	236 (68.8)	67 (58.3)	
	Private hospital	67 (19.5)	48 (41.7)	
Level of neonatal care	Level 1 (without neonatal unit)	126 (36.7)	50 (43.5)	0.40
	Level 2 (with neonatal care unit)	172 (50.2)	50 (43.5)	
	Level 3 (with neonatal intensive care unit)	45 (13.1)	15 (13.0)	
Annual number of births	<1500	213 (62.1)	74 (64.3)	0.25
	1500–2499	76 (22.2)	18 (15.7)	
	≥2500	54 (15.7)	23 (20.0)	
Crisis area	During first lockdown (March–May 2020)***	123 (35.9)	46 (40.0)	0.20
	During survey period (May–July 2021)****	66 (19.2)	35 (30.4)	
Teleconsultation implementation		232 (67.6)		

* including not-for-profit private hospitals.

** Chi-square test.

*** Defined as districts with a ratio of more than 2 deaths per 100,000 residents on March 23, 2020, according to Santé Publique France.

**** Defined as districts with incidence rates above 50 per 100,000 residents on June 17, 2021, again according to Santé Publique France.

down, 2) “mask wearing encouraged or required” (May–July 2021), and the independent variables were the maternity unit characteristics. Co-parent visits were considered only during the first lockdown as they were mostly authorised afterwards, and the wearing of masks was studied during the survey period, given the lack of masks for the population during the first lockdown. As the characteristics of maternity units are closely correlated, we chose to keep in the multivariate model the most significant variable: level of neonatal care of maternity unit, which is highly correlated with the size of the maternity unit and its status; Level 3 maternity units are mostly large public or even university maternity units in France. Odds ratios (ORs) and their 95% confidence intervals (CIs) were estimated.

All statistical tests were two-sided, and $P < 0.05$ was defined as statistically significant. Statistical analysis was conducted with R 4.2.0.

Ethics approval

This study was approved by the ethics committee of Lyon University Hospital (no. 21-126) and the National Data Protection Authority (*Commission Nationale de l'Informatique et des Libertés*) on 1 March 2021 (no. 2221367). Participants were informed of the purpose of the survey and participated only if they chose to – by completing the online questionnaire.

Results

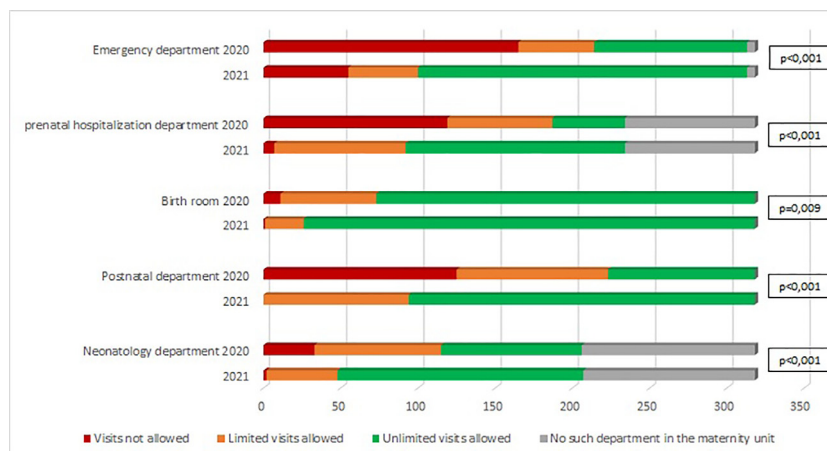
Characteristics of maternity units

We obtained 343 responses, i.e. from 75.2% of French maternity units, after excluding 274 questionnaires that were either duplicate or incomplete for part 1.

The characteristics of our sample did not differ significantly from all French maternity units for status ($P = 0.17$) and level of neonatal care ($P = 0.89$). Similarly, the characteristics of the maternity units with incomplete data ($n = 25$) excluded from the analysis did not differ significantly from those with complete data. The characteristics of maternity units that did and did not respond to the survey are described in Table 1.

Description of the course of co-parent visits in maternity units during the first lockdown and for 1 year afterwards (N = 318)

Fig. 1 summarises the organization of visits during the first lockdown (March–May 2020) and one year later (May–July 2021). During the first lockdown, only delivery room visits were almost always allowed. Visits were not allowed in 51.9% of the obstetric emergency departments, 39.3% of postnatal departments, 37.4% of prenatal hospitalization departments, 10.4% of neonatology departments, and 3.4% of delivery rooms. In 2021, only 17.3% of obstet-

**Fig. 1.** organization of co-parent visits.

This figure describes the distribution of visit authorizations according to maternity department and according to the period.

Table 2
Maternity units' attitudes to parturients' masking in birth rooms.

	During labor N = 319 n (column %)	While pushing N = 319 n (column %)
Allowed to remove the mask	29 (9.1)	167 (52.4)
Encourage to wear the mask	225 (70.5)	99 (31.0)
Required to wear the mask	34 (10.7)	6 (1.9)
No instructions were given about mask-wearing	31 (9.7)	47 (14.7)

Table 3

Co-parent visits not allowed in postpartum departments during the first lockdown (March–May 2020), by maternity unit characteristics.

		No visits allowed n (row %) N = 125	P**	Crude OR (95% CI)	Adjusted OR*** (95% CI)
Status	Public, university	18 (52.9)	0.13	1	
	Other public*	87 (39.4)		0.58 [0.28; 1.19]	
	Private	20 (31.7)		0.41 [0.17; 0.97]	
Neonatal care level	Level 1 (no neonatal unit)	36 (30.5)	0.02	1	1
	Level 2 (with neonatal care unit)	68 (42.5)		1.68 [1.02; 2.80]	1.61 [0.97; 2.68]
	Level 3 (with neonatal intensive care unit)	21 (52.5)		2.52 [1.21; 5.29]	2.34 [1.12; 4.96]
Annual number of births	<1500	67 (33.8)	0.005	1	
	1500–2499	29 (40.8)		1.35 [0.77; 2.35]	
	≥2500	29 (59.2)		2.83 [1.50; 5.45]	
Crisis area	No	70 (34.3)	0.02	1	1
	Yes	55 (48.2)		1.78 [1.12; 2.85]	1.68 [1.05; 2.70]

Values in bold are statistically significant.

* including not-for-profit private hospitals.

** Chi-square test or Fisher test, as appropriate.

*** Multivariate logistic regression (adjusted for neonatal care level and crisis area).

Table 4

Mask wearing by mothers during pushing encouraged or required during May–July 2021 survey period, by maternity unit characteristics.

		Mask wearing while pushing encouraged or required n (row %) N = 105	P**	Crude OR (95% CI)	Adjusted OR*** (95% CI)
Status	Public, university	6 (17.1)	0.002	1	
	Other public*	68 (30.6)		2.13 [0.90; 5.90]	
	Private	31 (50.0)		4.83 [1.85; 14.38]	
Neonatal care level	Level 1 (no neonatal unit)	40 (33.9)	0.02	1	1
	Level 2 (with neonatal care unit)	59 (36.9)		1.14 [0.69; 1.88]	1.10 [0.67; 1.83]
	Level 3 (with neonatal intensive care unit)	6 (14.6)		0.33 [0.12; 0.81]	0.31 [0.11; 0.77]
Annual number of births	<1500	65 (32.8)	0.20	1	
	1500–2499	28 (39.4)		1.33 [0.76 ; 2.33]	
	≥2500	12 (24.0)		0.64 [0.30 ; 1.29]	
Crisis area	No	79 (30.7)	0.12	1	1
	Yes	26 (41.9)		1.63 [0.91; 2.87]	1.42 [0.87; 2.34]

Values in bold are statistically significant.

* including not-for-profit private hospitals.

** Chi-square test or Fisher's exact test, as appropriate.

*** Multivariate logistic regression (adjusted for neonatal care level and crisis area).

ric emergency departments continued to prevent co-parent visits, 2.2% of prenatal hospitalization departments, 0.6% in neonatal departments, 0.3% in delivery rooms, and none in postpartum departments.

Description of maternity units' attitudes toward women wearing masks in the birth room during the survey period, May–July 2021 (N = 319)

Information on mask use was reported by 93% of maternity units (n = 298/319). In most units, staff recommended that women keep their mask on during labor (71%), while in slightly more than half, women were informed that they could remove it for pushing (52%). The details about wearing a mask in the birth room are described in Table 2.

Potential determinants of barrier measures implemented in maternity units

Level 3 maternity units, i.e., those caring for the highest-risk pregnancies and the most fragile infants, were the most likely not to allow co-parent visits to the hospital during the first lockdown (March–May 2020) (Table 3). Those were also, however, the maternity units that most often allowed women to remove their masks while pushing in the survey period (Table 4). Maternity units located in crisis areas during the first lockdown forbade visits then significantly more often.

Discussion

Main findings

A year after the pandemic began, maternity hospitals had adapted their practices by opening up possibilities for the

co-parent's presence, especially during the postpartum period. Nonetheless, maternity units with the most fragile infants (very premature newborns) maintained more restrictions on visits than the others. At the same time, these university hospital maternity units were those that allowed mask removal most frequently. Maternity units in crisis areas during the first lockdown had significantly more restrictions on visits.

Strengths and limitations

The main strengths of our study are that it included 75% of French maternity units and that characteristics of our sample did not differ from those of all French maternity units, that is, our sample was representative.

Nevertheless, our study has some limitations, the first one being the self-administered questionnaire, which can result in a social desirability bias. The second is a memory bias for the questions concerning the situation during the first lockdown period, even though this period was extremely particular and people had more or less memorized its organization. We also note a selection bias, with a majority of private maternity hospitals not responding to the questionnaire, which might have influenced the results of the univariate analysis. This is why we preferred to use level of care in the multivariate model. Lastly, we questioned the midwifery supervisors about their maternity unit's policies. We did not measure the actual practices of the midwives in maternity departments, especially concerning the wearing of masks. There were undoubtedly variations in practice with some midwives probably choosing to ignore the directives.

Interpretation

We observed the changes in health measures such as co-parent visits over time. The massive banning of visits, also observed internationally (Coxon et al., 2020; Bradfield, 2021), is easily explained by the lack of knowledge about the SARS-CoV2 virus at the beginning of the pandemic; health-care providers and public health authorities wanted to reduce or even stop its circulation and avoid the contamination of women and hospital staff. The higher proportion of "no-visit" rules in Level 3 maternity units is due to their care for the most at-risk or pathological pregnancies and therefore the most vulnerable mother-child dyads. Nevertheless, these are also the women who most need support from their co-parent. The change in visiting rules for co-parents was probably influenced by better knowledge of both the virus and the factors associated with contamination, as well as better availability of protective equipment, the massive vaccination of the population, and the compulsory vaccination of health-care professionals. We observed the role of the crisis area in allowing visits but not in the wearing of masks. At the beginning of the pandemic, there was a fear of the virus and an increase in barrier measures in these territories that we did not find one year later.

Lobbying by user associations probably played a role in reducing restrictions. In addition, the French College of Gynaecologists and Obstetricians (CNGOF) published guidance on allowing the admission of co-parents to antenatal consultations, birth rooms, and post-partum hospitalization on 20 April 2020 (CNGOF, 2020a). The variability of practices observed in our study shows the need for a concerted effort by professional societies to provide guidelines rapidly to professionals and facilities. During the follow-up telephone calls, many midwifery supervisors told us of their isolation and how hard it was for them to make these decisions.

While wearing a surgical mask has been shown to be effective in preventing transmission of the virus (Sterr et al., 2021; Chazelet, Pacault, 2022), studies about the effects of

masks on childbirth outcomes have confounding biases, less-than-robust methodology, and contradictory results (Dap et al., 2021; Friedrich et al., 2021). Moreover, its compulsory use may cause significant discomfort or even be perceived as dehumanizing. In France, the wearing of masks by women in the birth room caused debate and even controversy. At the beginning of the pandemic, France did not have enough masks for health-care workers, let alone parents (Calvignac, Gaglio, 2022). As soon as masks became available they were made compulsory in hospitals for both staff and patients. With the arrival of vaccination, the question of wearing masks in birth rooms re-emerged. Some professional societies advised keeping their use compulsory, while others advised removing the mask when pushing started (CNGOF, 2020b; CNSF, 2020; HAS, 2020). The college of obstetricians on the whole favoured these masks, while the college of midwives mostly did not (CNSF, 2020; Peyronnet et al., 2020). This difference could explain the greater use of masks in private maternity hospitals where nearly all deliveries are attended by obstetricians, whereas in public maternity units midwives attend most births. To our knowledge, France is the only country where this issue led to an important public debate.

It can be seen that during this crisis and in the face of major uncertainties, women's rights were called into question. In France, women's groups and associations reacted: the imposition of the wearing of masks during childbirth and the restrictions on visits to maternity wards reopened the debate on obstetric violence (Schantz et al., 2021). Studies show that midwives experienced major difficulties at the beginning of the pandemic (González-Timoneda et al., 2021; Küçüktürkmen et al., 2022). Clear information from professional societies is now essential to ensure that midwives do not feel isolated and can provide women with the best care in any situation.

Perspectives

Our study shows that the imposition of barrier measures was modified over the course of the pandemic, although practices remained quite variable. It would be interesting today to evaluate the satisfaction and the psychological state of women at a distance from the acute phase of the pandemic, as the health situation persists and these health measures continue. It is also important to evaluate midwives' satisfaction and their position with regard to various measures that they must apply without necessarily agree with them.

Implication for practices/conclusion

Maternity units implemented barrier measures as a drastic safety step at the beginning of the pandemic, but were able to adapt these measures over time. It is now time to learn from this experience to ensure that women, co-parents, and infants are no longer harmed by these measures.

First, information should be able to be disseminated internationally more rapidly, to be able to draw on the experiences of others. But above all, the various professional societies should work together to jointly propose recommendations and guidelines to guide professionals and facilities, with the involvement of patients' associations.

Ethics approval

This study was approved by the ethics committee of Lyon Hospital (no. 21-126) and the National Data Protection Authority (Commission Nationale de l'Informatique et des Libertés), 1 March 2021 (no. 2221367).

Participants were informed of the purpose of the survey and participated only if they chose to – by completing the online questionnaire. They could withdraw at any time.

Credit author statement

All authors (AR, MDJ, CS, LG) participated in the conception, design, and interpretation of the results. AR, MDJ, LG have collected the data. AR conducted the content analysis. AR wrote the article, and all the other authors reviewed the article.

Conflict of interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interests in the subject matter of this article.

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