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SUPPLEMENT ARTICLE

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Women's perspectives on the quality of maternal and newborn care in childbirth during the COVID-19 pandemic in Latvia: Results from the IMAgiNE EURO study on 40 WHO standards-based quality measures

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Abstract

Objective: To investigate women's perspectives on the quality of maternal and newborn care (QMNC) around the time of childbirth during the COVID-19 pandemic in Latvia, comparing the years 2020 and 2021, among women who went into labor or had a prelabor cesarean.

Methods: Women giving birth in healthcare facilities in Latvia from March 1, 2020, to October 28, 2021, answered an online questionnaire including 40 WHO standards-based quality measures. Descriptive and multivariate quantile regression analyses were performed to compare QMNC in 2020 and 2021.

Results: 2079 women were included in the analysis: 1860 women who went into labor (group 1) and 219 with prelabor cesarean (group 2). Among group 1, 66.4% (n = 99/149) of women received fundal pressure in an instrumental vaginal birth, 43.5% (n = 810) lacked involvement in choices, 17.4% (n = 317) reported suffering abuse, 32.7% (n = 609) reported inadequate breastfeeding support while 5.2% (n = 96) lack of early breastfeeding. A significant reduction in QMNC due to the COVID-19 pandemic was reported by 29.5% (n = 219) and 25.0% (n = 270) of respondents in 2020 and 2021, respectively (P = 0.045). Multivariate analyses highlighted a significantly lower QMNC index for 2020 compared with 2021 (P < 0.001).

Conclusion: This first study investigating QMNC in Latvia showed significant gaps in QMNC perceived by respondents, with slightly better results in 2021. Appropriate healthcare strategies to improve health care for women and newborns in Latvia are required.

ClinicalTrials.gov Identifier:NCT04847336.

KEYWORDS
childbirth, COVID-19, Eastern Europe, IMAgiNE EURO, Latvia, maternity care, newborn care, quality of care

1 | INTRODUCTION

In 2016, after a consultation period with an expert board, the World Health Organization (WHO) established a set of standards for improving maternal and newborn quality of care in health facilities.[1] The goal of adopting these criteria is to decrease maternal and perinatal mortality and morbidity and increase the frequency of positive experiences of respectful and evidence-based health care. WHO emphasizes the importance of a woman-centered childbirth environment in which mothers feel free, secure, and respected, with a low risk of traumatic experiences that can cause subsequent fear and mistrust in the healthcare system.[2,3]

The first step in implementing the WHO standards is assessing the existing quality of care. However, like the majority of Central Eastern European (CEE) countries, Latvia lacks research that examines the quality of maternal and newborn care (QMNC) during childbirth in a comprehensive way (i.e. examining the different domains of quality of care)[4] and no studies have been conducted using the WHO standards as a framework for the analysis.[1]

Latvia has a much higher maternal mortality rate than the rest of the European Union, with 19 maternal deaths per 100 000 live births in 2017 compared with the European average of 6 deaths per 100 000 births,[5] and low access to effective maternity care.[4] However, in terms of early neonatal and infant mortality, Latvia's indicators are closer in line with European data, with a reported early neonatal death rate of 1.8 per 1000 live births in 2019 compared with 2.8 per 1000 live births in the WHO European region, and an infant mortality rate of 3.4 per 1000 live births, which is the same as the average in the EU.[6–8] The cesarean rate in 2020 in Latvia was 22.2%[6] and it is one of the few European countries where the rate tends to decrease.[9] Although the average number of cesareans in the country is not high, the high proportion of operative births in small low-risk maternity wards, as well as in primiparous women in Robson Group 1 (15.0%) and Robson Group 2 (33.2%) in 2020 in Latvia,[10,11] is a cause for concern.

For the last two decades, Latvia's health system has been reforming with ongoing continuous adjustments to overcome budget constraints and seek to improve maternity and newborn health care.[12] Latvia presently has a nationwide single-payer health system that offers universal health care financed by general tax revenues[13]; however, the country has one of the lowest health expenditure ratios in Europe, with a gross domestic product of 6.3% in 2017[12] compared with an average of 9.6% in Europe.[14] The current coverage plan provides access to a relatively broad range of healthcare services. Women in pregnancy and up to 70 days after childbirth and children aged under 18 years are legally exempt from paying fees for any of the healthcare services on the statutory list. However, due to lengthy waiting lists for medical procedures and consultations in the public system, patients—including pregnant women—frequently choose to pay out of pocket.[12,15]

Since the WHO declared COVID-19 a pandemic in March 2020, numerous changes have occurred in healthcare systems throughout Europe, adding a layer of complexity to maternal and newborn care.[16] Changes in the organization of care due to the COVID-19 pandemic (e.g. use of personal protective equipment [PPE] during labor, reduced numbers of healthcare personnel, requirement for COVID-19 testing, and increased risk of spread of intrahospital infections) were all factors that may have affected perceived quality of care during the pandemic.[17–19] Inappropriate practices, such as unnecessary separation of the baby from the mother and violations of women's rights, have also been documented during the pandemic.[20–22]

IMAgiNE EURO is a multicountry study[23] aimed at understanding women's perspectives on the quality of care around childbirth during the COVID-19 pandemic in different countries, using an online validated questionnaire exploring 40 WHO standards-based quality measures. The aim of the present study was to investigate women's perspectives on QMNC around the time of childbirth during the COVID-19 pandemic in healthcare facilities in Latvia, with emphasis on changes over time by comparing the year 2020, when strict COVID-19-related restrictions were in place, with 2021, when limitations were eased. Results were analyzed in two subgroups: women who went into labor and women who had a prelabor cesarean.

2 | MATERIALS AND METHODS

2.1 | Study design and participants

This cross-sectional study used the Strengthening the Reporting of Observational Studies (STROBE) in Epidemiology guidelines.[24] The study protocol was registered in ClinicalTrials.gov (NCT04847336).

Women aged 18 years or older who gave birth in Latvia from March 1, 2020, until October 28, 2021, were invited to participate in an online survey. Women who did not give birth in a hospital were excluded from the study. The online survey was available in Latvian, Russian, and more than 20 other languages. The survey was promoted through a dissemination plan that focused primarily on social media (Facebook, Instagram influencer accounts, parenting groups and forums). Furthermore, nongovernmental organizations, universities, hospitals, and other institutions were asked to promote the survey through their social media accounts, websites, and newsletters.

2.2 | Data collection

Data were collected from June 13, 2021, until October 28, 2021, using a structured validated online questionnaire,[25] based on

the WHO standards of care,[1] and recorded using REDCap 8.5.21 (Vanderbilt University) via a centralized platform.

The questionnaire included sociodemographic questions and 40 questions—each on one WHO standards-based quality measure—equally distributed across four domains: provision of care (10 questions), experience of care (10 questions), availability of human and physical resources (10 questions), and essential organizational changes related to the COVID-19 pandemic (10 questions). The 40 measures of the questionnaire contributed to a composite QMNC index (scoring from 0–100), developed as a complementary synthetic measure of QMNC, with higher scores indicating higher adherence to WHO standards.

The process of questionnaire development, validation, and previous use has been reported elsewhere.[25–29] The questionnaire was developed in English, translated into Latvian, and back-translated according to The Professional Society for Health Economics and Outcomes Research (ISPOR) Task Force for Translation and Cultural Adaptation Principles of Good Practice.[30]

2.3 | Data analysis

Duplicates and cases missing 20% or more answers on 45 key variables (including the 40 key quality measures) and five key sociodemographic variables (i.e. date of birth, age, education, parity, and whether the woman gave birth in the same country where she was born) were excluded.

Descriptive statistics of sociodemographic characteristics and quality measures were reported as absolute frequency and percentage, year of childbirth was compared (i.e. 2020 vs. 2021), and the results were grouped by experience of labor (i.e. women who went into labor vs. those who had a prelabor cesarean). These two groups differed in a few quality measures and were grouped as follows: women with a vaginal birth were considered to have experienced labor; women who had an emergency cesarean were categorized based on their report of having undergone labor (experience of regular uterine contractions) or not, which was informed by the NICE definition of labor provided to them in the questionnaire.[31]

Differences in sociodemographic characteristics between the groups were tested with the χ^2 or Fisher exact test. Differences in quality measures by year in both subgroups were tested with adjusted odds ratios (ORs) (i.e. adjusting for all sociodemographic variables, type of professionals directly assisting the birth, newborn admission in neonatal intensive or special care baby units, and multiple births).

Quality of maternal and newborn care indexes were calculated based on the predefined criteria previously described[23] for all women providing an answer to all 40 key quality measures. As they were not normally distributed, the QMNC indexes were presented as median and interquartile ranges (IQRs) and plotted by year of childbirth (kernel density). Differences by year of childbirth were firstly tested with a Wilcoxon–Mann–Whitney test and, secondly, to account for potential confounders, multivariate quantile regression models with robust standard errors for the 0.25th, 0.50th, and 0.75th centile were performed with the QMNC index as the dependent variable and all sociodemographic variables, mode of birth, and type of professionals assisting the woman during birth, newborn admission in neonatal intensive or special care baby units, and multiple birth as independent variables, collapsing age and educational level categories with low frequencies. The categories with the highest frequency were used as reference.

Two-tailed $P < 0.05$ was considered statistically significant. Statistical analyses were performed using Stata/SE version 14.0 (Stata Corporation) and R version 4.1.1.[32]

3 | RESULTS

3.1 | Participants' characteristics

From all countries involved in the full study, 39 542 women accessed the online questionnaire and, of these 35 556 (89.9%) agreed to participate. By October 28, 2021, the Latvian questionnaire had been accessed by 2914 women, of whom 2750 gave informed consent (94.2%). After excluding women who gave birth outside Latvia, suspected duplicates, and cases missing ≥20% of key variables, a total of 2079 reports of women giving birth in Latvia were analyzed (Figure 1). Of these, 833 gave birth in 2020, accounting for 4.8% of the total 17 344 births in Latvia in 2020, while 1205 women gave birth in 2021, accounting for 7.0% of the total 17 206 births in 2021.[11]

The characteristics of respondents are shown in Table 1. Most of the women were aged 25–35 years (75.9%, $n = 1577$), with a university degree or higher education (73.8%, $n = 1535$), and originally born in Latvia (97%, $n = 2017$). About half were experiencing being in labor for the first time (53.5%, $n = 1113$). No major differences in women's characteristics were observed by year of childbirth.

3.2 | QMNC indexes and multivariate analysis

The QMNC indexes (Figure 2) differed by subdomains ($P < 0.001$), with a median index of 85.0 (IQR 75.0–90.0) for provision of care; 85.0 (IQR 70.0–95.0) for experience of care; 70.0 (IQR 55.0–80.0) for availability of physical and human resources; and 90.0 (IQR 80.0–100.0) for reorganizational changes due to COVID-19. The total QMNC index and the QMNC index in each of the four subdomains were significantly higher in 2021 compared with 2020 ($P < 0.001$).

When adjusting for sociodemographic and obstetric variables, quantile regression showed a significantly higher QMNC index in 2021 compared with 2020 (coefficient variation at the 0.25th, 0.50th, and 0.75th quantile respectively of +15, +20, +10) (Table 2). Multiparous women, women assisted by an obstetrician/gynecologist, and women born outside Latvia also had statistically significant a higher QMNC index at more centiles (+22.5, +10, +5 for multiparous women; +15, +10, +5 for women assisted by an obstetrician/gynecologist; +30, +10, 0 for women born outside Latvia). Conversely, instrumental vaginal birth, cesarean, and young women were associated with a statistically significant lower QMNC index at more centiles (−5, −15, −15 for instrumental vaginal birth; −30, −20,

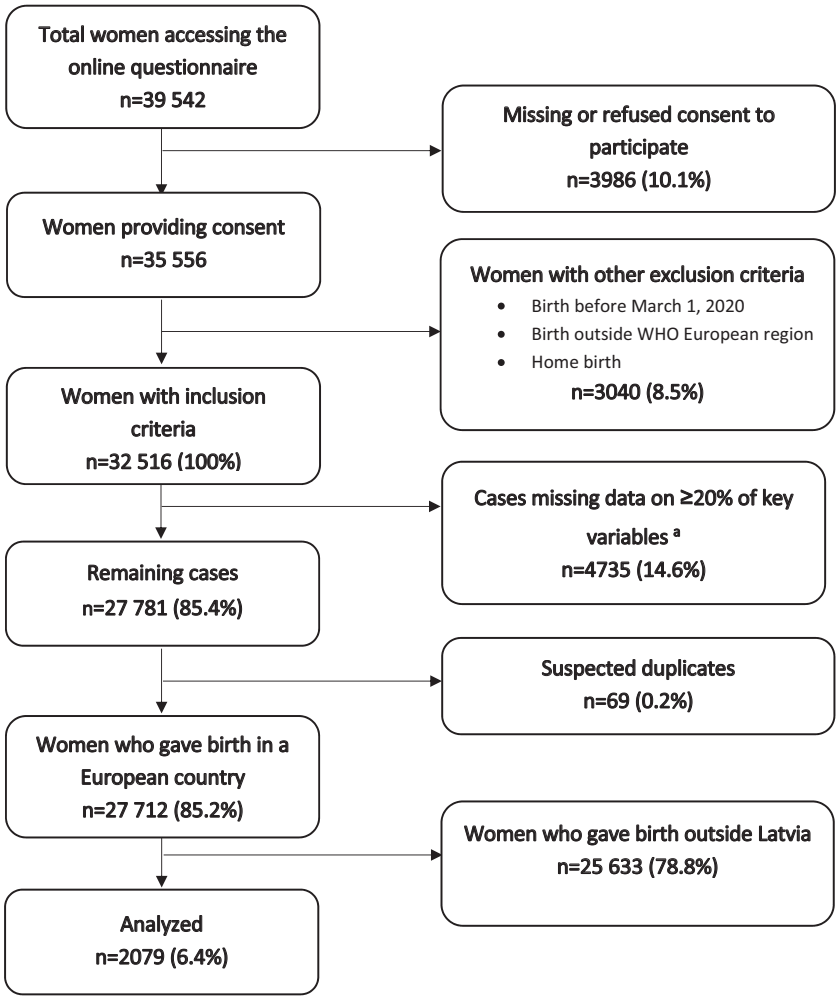

FIGURE 1 Study flow diagram. [a]We used 45 key variables (40 key quality measures and five key sociodemographic questions).

−15 for cesarean, and −12.5, −15, −10 for women aged 18–24 years compared with women aged 31–35 years). In addition, women with a lower educational level, newborn admitted to the NICU, and multiple birth reported a significantly lower QMNC score in a single centile.

3.3 | WHO standards-based quality measures

Figures 3–6 compare the years 2020 and 2021 for each of 40 key quality measures in women who went into labor (Panel a) and those who had a prelabor cesarean (Panel b) in the four QMNC domains explored. Data are provided as the frequency on the overall sample (gray dot) and the frequency on the sample of women giving birth each year (colored dots). Table 3 includes more thorough information with multiple logistic regression analysis comparing quality measures between women who went into labor (n = 1860) and women who had a prelabor cesarean (n = 219) when adjusted for year of childbirth and other sociodemographic variables.

In the provision of care domain (Figure 3) in some measures the situation improved or showed no statistically significant difference when compared by year. Key findings for women who went into labor (n = 1860) were: 35.3% (n = 656) were not given pain relief during labor (without significant difference by year); 66.4% (n = 99/149) received fundal pressure during instrumental vaginal birth (without significant difference by year); 32.7% (n = 609) reported inadequate breastfeeding support (with a significant difference between 2020 and 2021: 38.9% vs. 28.7%, P <0.001); 28.8% (n = 535) reported lack of exclusive breastfeeding at discharge (31.5% vs. 26.7%, without significant difference by year); and 24.5% (n = 456) reported lack of immediate attention when needed (significant difference between 2020 and 2021: 27.3% vs. 22.0%).

Regarding the data on experience of care (Figure 4; Table 3), several indicators improved in 2021 compared with 2020, with the quality measure of limited companionship showing the most significant improvement (falling from 43.1% to 30.7%, P <0.001). Other key findings included: 59.7% (n = 89/149) of women who had an instrumental vaginal birth were not asked to provide consent for this mode of birth; 47.2% (n = 713/1512) of women who had a spontaneous vaginal birth had no choice of birth position; out of the total sample, 43.5% (n = 810) did not feel involved in choices about their care. Notably, almost one-fifth (17.0% to 17.8%) of all women reported suffering from physical, verbal, or emotional abuse.

Women who had a prelabor cesarean had an increased odds of not being allowed a birth companion (aOR 1.40; 95% CI, 1.04–1.88,

TABLE 1 Characteristics of respondents

	Overall[a]	Year of childbirth		
		2020	2021	
	n = 2079	*n* = 833	*n* = 1205	
	No. (%)	No. (%)	No. (%)	*P* value
Age range, year				
18–24	218 (10.5)	75 (9.0)	140 (11.6)	0.059
25–30	908 (43.7)	373 (44.8)	530 (44.0)	0.723
31–35	669 (32.2)	274 (32.9)	394 (32.7)	0.926
36–39	209 (10.1)	93 (11.2)	115 (9.5)	0.235
≥40	44 (2.1)	18 (2.2)	26 (2.2)	0.996
Missing	41 (1.5)	0 (0.0)	0 (0.0)	NA
Educational level[b]				
None	1 (0.0)	1 (0.1)	0 (0.0)	0.409
Elementary school	22 (1.1)	7 (0.8)	15 (1.2)	0.385
Junior high school	199 (9.6)	80 (9.6)	115 (9.5)	0.964
High school	291 (14.0)	111 (13.3)	178 (14.8)	0.357
University degree	913 (43.9)	391 (46.9)	520 (43.2)	0.091
Postgraduate degree/Master/Doctorate or higher	622 (29.9)	243 (29.2)	377 (31.3)	0.308
Missing	41 (1.5)	0 (0.0)	0 (0.0)	NA
Born in Latvia				
Yes	2017 (97.0)	821 (98.6)	1187 (98.5)	0.922
No	31 (1.5)	12 (1.4)	18 (1.5)	0.922
Missing	41 (1.5)	0 (0.0)	0 (0.0)	NA
Parity				
1	1113 (53.5)	474 (56.9)	634 (52.6)	0.056
>1	935 (45.0)	359 (43.1)	571 (47.4)	0.056
Missing	41 (1.5)	0 (0.0)	0 (0.0)	NA
Mode of birth				
Vaginal spontaneous	1512 (72.7)	593 (71.2)	886 (73.5)	0.245
Instrumental vaginal birth	149 (7.2)	55 (6.6)	93 (7.7)	0.340
Cesarean	418 (20.1)	185 (22.2)	226 (18.8)	0.056
Other characteristics				
Newborn admission to NICU or SCBU	148 (7.1)	58 (7.0)	87 (7.2)	0.893
Maternal admission to ICU	10 (0.5)	5 (0.6)	5 (0.4)	0.790
Multiple birth	26 (1.3)	14 (1.7)	12 (1.0)	0.249
Stillbirths	2 (0.1)	1 (0.1)	0 (0.0)	0.853
Presence of an obstetrics/gynecology doctor in the team who assisted the birth	1247 (60.0)	511 (61.3)	731 (60.7)	0.792

Abbreviations: ICU, intensive care unit; NICU, neonatal intensive care unit; SCBU, special care baby unit.

[a]Overall results include 41 women with missing year of childbirth.

[b]Wording on education levels agreed among partners during the Delphi. Questionnaire translated and back-translated according to ISPOR Task Force for Translation and Cultural Adaptation Principles of Good Practice.

P = 0.027) compared with women who went into labor (Table 3), with a slight but not significant improvement in 2021 (52.2% vs. 42.4%, *P* = 0.073).

Regarding the domain of availability of physical and human resources (Figure 5; Table 3) both subgroups highlighted inadequate partner visiting hours (44.7% and 46.6%, respectively). In 2021, the situation improved by 7.7% in the labor group (*P* <0.001), and by 7.9% in the prelabor cesarean group (*P* = 0.055). A small percentage of women who went into labor reported inadequate room cleaning (2.3%, *n* = 42), inadequate number of women per room (4.2%, *n* = 79), and

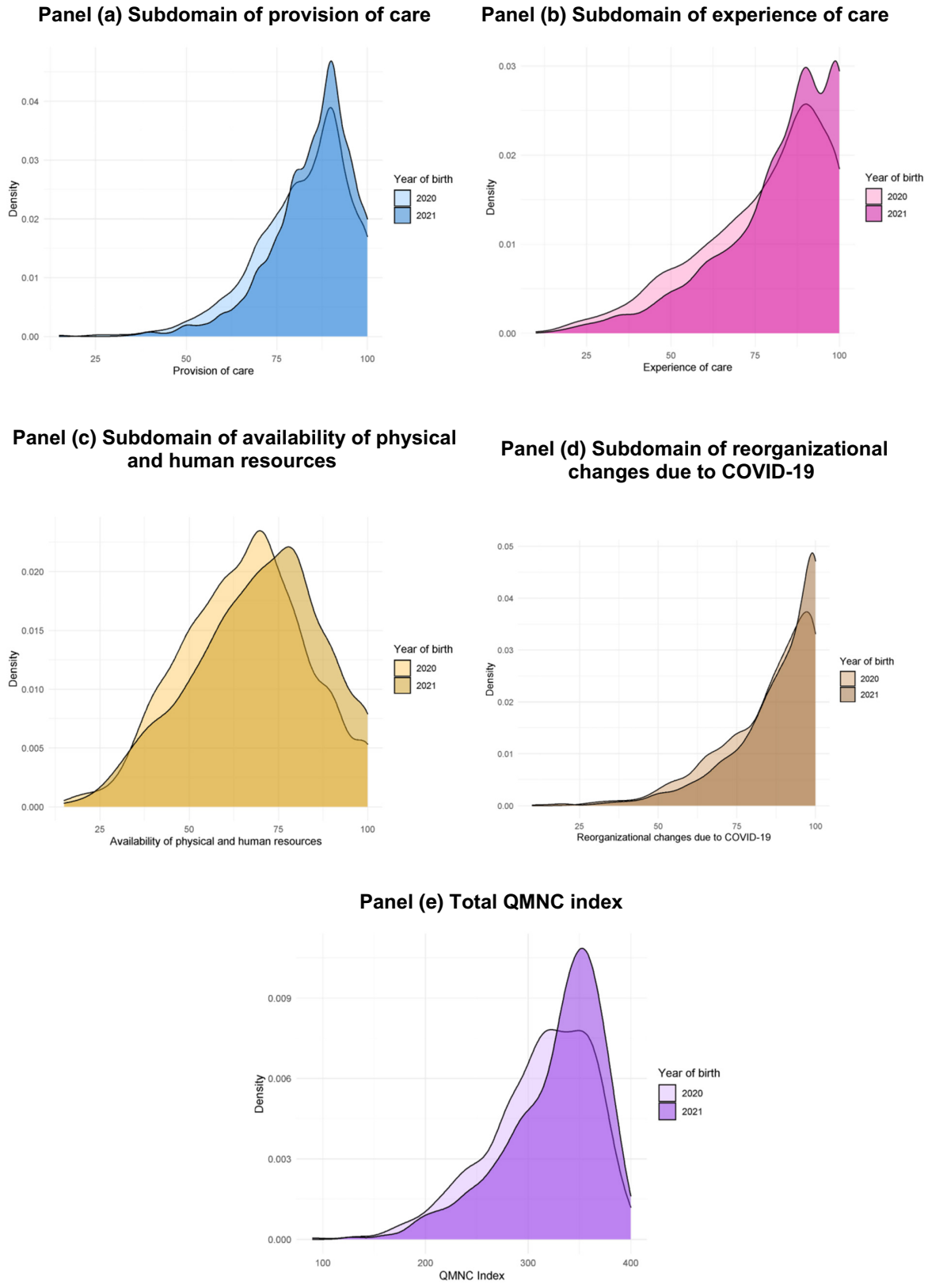

FIGURE 2 Quality of maternal and newborn care (QMNC) index by year of labor. (a) Subdomain of provision of care. (b) Subdomain of experience of care. (c) Subdomain of availability of physical and human resources. (d) Subdomain of reorganizational changes due to COVID-19. (e) Total QMNC index

TABLE 2 Multiple quantile regression ($n = 1659$)

	0.25th centile		0.50th centile (median)		0.75th centile	
	Coefficient (95% CI)	*P* value	Coefficient (95% CI)	*P* value	Coefficient (95% CI)	*P* value
Year of childbirth						
2020	Ref		Ref		Ref	
2021	15.00 (7.63–22.37)	<0.001	20.00 (14.63–25.37)	<0.001	10.00 (4.66–15.34)	<0.001
Parity						
1	Ref		Ref		Ref	
>1	22.50 (14.02–30.98)	<0.001	10.00 (3.97–16.03)	0.001	5.00 (0.79–9.21)	0.020
Women born in Latvia						
Yes	Ref		Ref		Ref	
No	30.00 (15.72–44.28)	<0.001	10.00 (1.24–18.76)	0.025	0.00 (−16.22 to 16.22)	>0.99
Age range, year						
18–24	−12.50 (−28.53 to 3.53)	0.126	−15.00 (−26.93 to −3.07)	0.014	−10.00 (−16.80 to −3.20)	0.004
25–30	Ref		Ref		Ref	
31–35	0.00 (−8.84 to 8.84)	>0.99	0.00 (−6.08 to 6.08)	>0.99	−5.00 (−9.03 to 0.97)	0.015
>35	2.50 (−7.93 to 12.93)	0.638	0.00 (−9.77 to 9.77)	>0.99	5.00 (−0.22 to 10.22)	0.061
Educational level						
High school or lower	−7.50 (−17.36 to 2.36)	0.136	−5.00 (−12.31 to 2.31)	0.180	−5.00 (−9.28 to −0.72)	0.022
University degree	Ref		Ref		Ref	
Postgraduate degree/ Master/Doctorate or higher	5.00 (−3.18 to 13.18)	0.231	0.00 (−6.31 to 6.31)	>0.99	0.00 (−4.14 to 4.14)	>0.99
Mode of birth						
Spontaneous VB	Ref		Ref		Ref	
Instrumental VB	−5.00 (−13.89 to 3.89)	0.270	−15.00 (−27.14 to −2.86)	0.015	−15.00 (−27.74 to −2.26)	0.021
Cesarean	−30.00 (−41.87 to −18.13)	<0.001	−20.00 (−27.99 to −12.01)	<0.001	−15.00 (−19.99 to −10.01)	<0.001
Obstetrics/gynecology doctor in the team who assisted the birth						
No	Ref		Ref		Ref	
Yes	15.00 (6.82–23.18)	<0.001	10.00 (4.33–15.67)	0.001	5.00 (1.48–8.52)	0.005
Newborn admission to NICU or SCBU						
No	Ref		Ref		Ref	
Yes	−25.00 (−45.63 to −4.37)	0.018	−30.00 (−70.44 to 10.44)	0.146	−5.00 (−29.60 to 19.60)	0.690
Multiple birth						
No	Ref		Ref		Ref	
Yes	−32.50 (−119.90 to 54.90)	0.466	−45.00 (−82.68 to −7.32)	0.019	−25.00 (−141.97 to 91.97)	0.675
Intercept	270.00 (259.01–280.99)	<0.001	315.00 (307.71–322.29)	<0.001	350.00 (343.44–356.56)	<0.001

Abbreviations: NICU, neonatal intensive care unit; SCBU, special care baby unit; VB, vaginal birth.

inadequate room comfort and equipment (4.9%, $n = 91$). Furthermore, a high percentage of women who went into labor or had a prelabor cesarean reported that they did not receive information on maternal danger signs (62.9% vs. 67.1%, respectively; aOR 1.37; 95% CI, 1.00–1.87, $P = 0.045$) and no information on newborn danger signs (74.2% vs. 74.9%, respectively; aOR 1.25, 95% CI, 0.89–1.75, $P = 0.193$).

In the domain of reorganizational changes due to the COVID-19 pandemic (Figure 6; Table 3), several indicators showed improved practices in 2021 compared with 2020 among women who went into labor: communication inadequate to contain COVID-19-related stress (30.1% vs. 22.0%, $P < 0.001$); healthcare provider not always using PPE (22.7% vs. 14.4%,

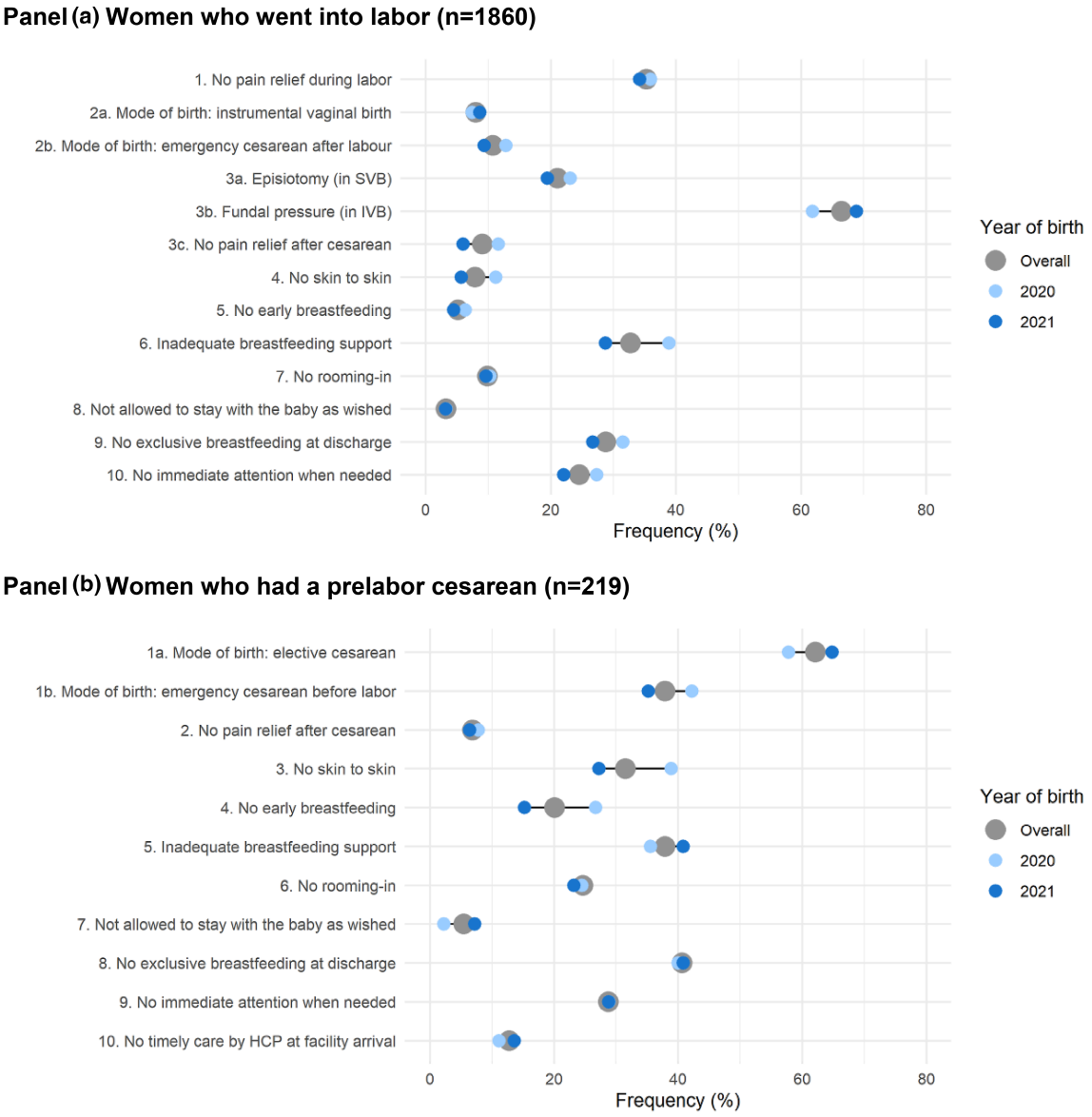

FIGURE 3 Provision of care. (a) Women who went into labor ($n = 1860$). (b) Women who had a prelabor cesarean ($n = 219$). HCP, healthcare provider; IVB, instrumental vaginal birth; SVB, spontaneous vaginal birth. *Note:* Data are reported as frequency on the total sample (gray dot) and as frequency on the sample of women giving birth in 2020 and 2021 (colored dots). The horizontal gray line represents the range of the frequencies. All the indicators in the domain of provision of care are directly based on WHO standards. Indicators identified with letters (e.g. 3a, 3b) were tailored to take into account different mode of birth (i.e. spontaneous vaginal, instrumental vaginal, and cesarean). These were calculated on subsamples (e.g. 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

$P < 0.001$); reduction in QMNC due to COVID-19 (29.5% vs. 25.0%, $P = 0.045$). Women who had a prelabor cesarean had similar results, with the most notable reductions over time found in percentage of healthcare providers not always using PPE (31.1% vs. 15.2%, $P = 0.004$) and in communication inadequate to contain COVID-19-related stress (34.4% vs. 20.0%, $P = 0.006$).

Multiple logistic regression (Table 3) highlighted that women who had a prelabor cesarean had an increased odds of inadequate ward reorganization (aOR 1.49; 95% CI, 1.09–2.03; $P = 0.012$) compared with women who went into labor.

4 | DISCUSSION

This is the first research in Latvia to adopt a comprehensive approach to explore women's perceptions of quality of care around childbirth at health facilities. Several results are similar to the few existing reports.[4,5,16] Previous research conducted in Latvia[4] suggested inadequate QMNC, even before the COVID-19 pandemic, and proposed recommendations to reduce Latvia's maternal mortality ratio—one of the highest in the EU.[5]

Similarly, other quality of care indicators reported in our study are aligned with prepandemic data. For example, the observed lack

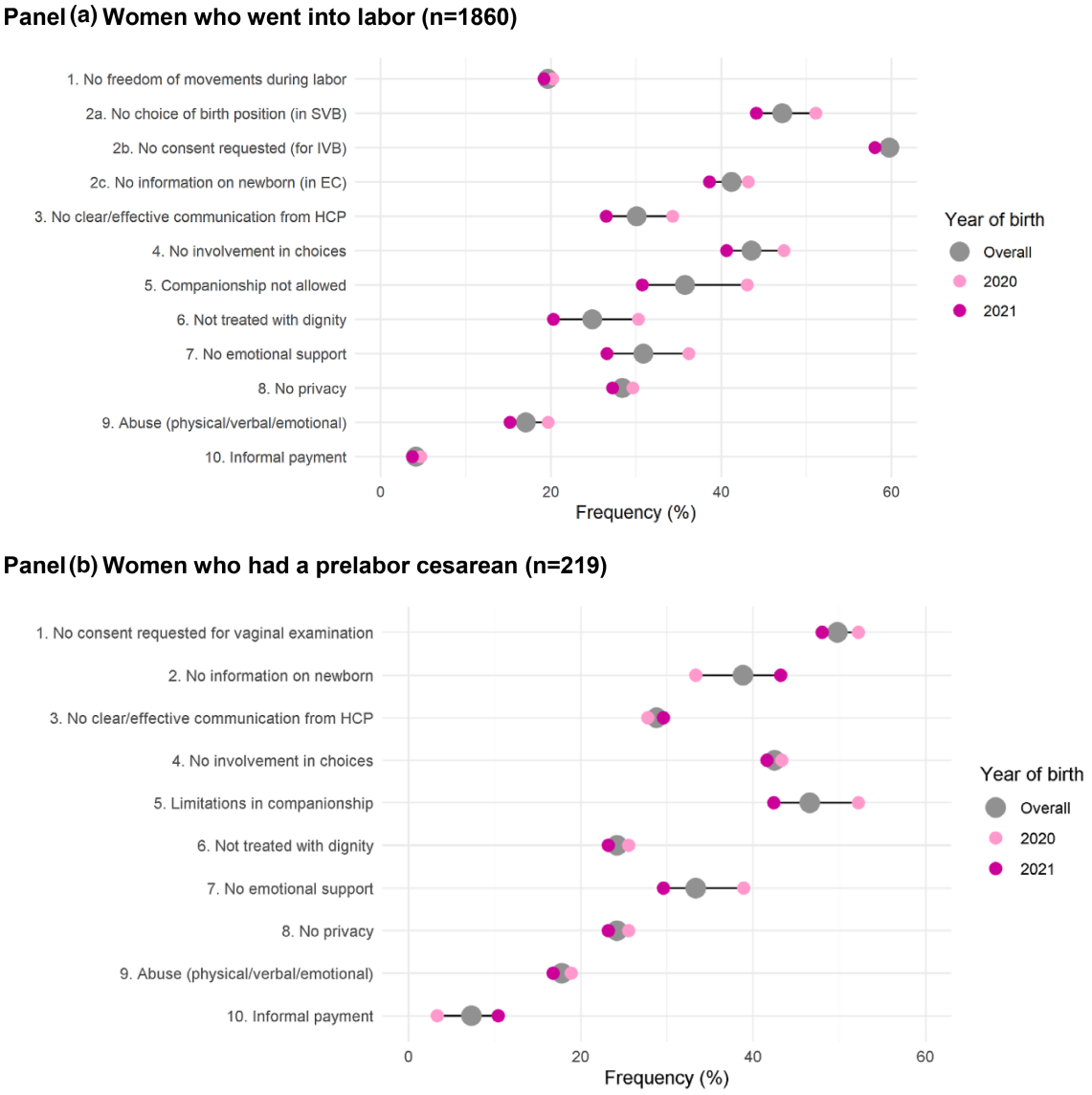

FIGURE 4 Experience of care. (a) Women who went into labor ($n = 1860$). (b) Women who had a prelabor cesarean ($n = 219$). EC, emergency cesarean; HCP, healthcare provider; IVB, instrumental vaginal birth; SVB, spontaneous vaginal birth. *Note*: Data are reported as frequency on the total sample (gray dot) and as frequency on the sample of women giving birth in 2020 and 2021 (colored dots). The horizontal gray line represents the range of the frequencies. All the indicators in the domain of experience of care are directly based on WHO standards. Indicators identified with letters (e.g. 2a, 2b) were tailored to take into account different modes of birth (i.e. spontaneous vaginal, instrumental vaginal, and cesarean). These were calculated on subsamples (e.g. 2a was calculated on spontaneous vaginal births; 2b was calculated on instrumental vaginal births).

of breastfeeding support (32.7% in our study) aligns with previous data on challenges toward achieving acceptable breastfeeding rates in the country.[33,34]

The COVID-19 pandemic has posed additional challenges for Latvian healthcare systems. For example, existing literature has documented that in Latvia, antenatal checkups have been postponed or canceled due to women's concerns about infection or viral spread, resulting in an increase in untreated illnesses throughout pregnancy, leading to emergencies, complications, and death during pregnancy, childbirth, or the postnatal period.[18] In our study, 22.5% of women reported difficulties in attending routine antenatal visits, with an improvement of only approximately 4% in 2021 when compared with 2020.

Furthermore, our data on lack of partnership during childbirth (35.8% of women who went into labor and 46.6% of women who had a prelabor cesarean) are in line with a previous report, which showed that in Latvia, partners did not participate in the birth in 32.5% of cases.[35] During the early phase of the pandemic, most obstetrics departments in Latvia did not allow partners or other family members to be a birth companion. Encouragingly, our data show an improvement in this quality measure in 2021 compared with 2020 of 12.4%. However, several other indicators showed a trend for

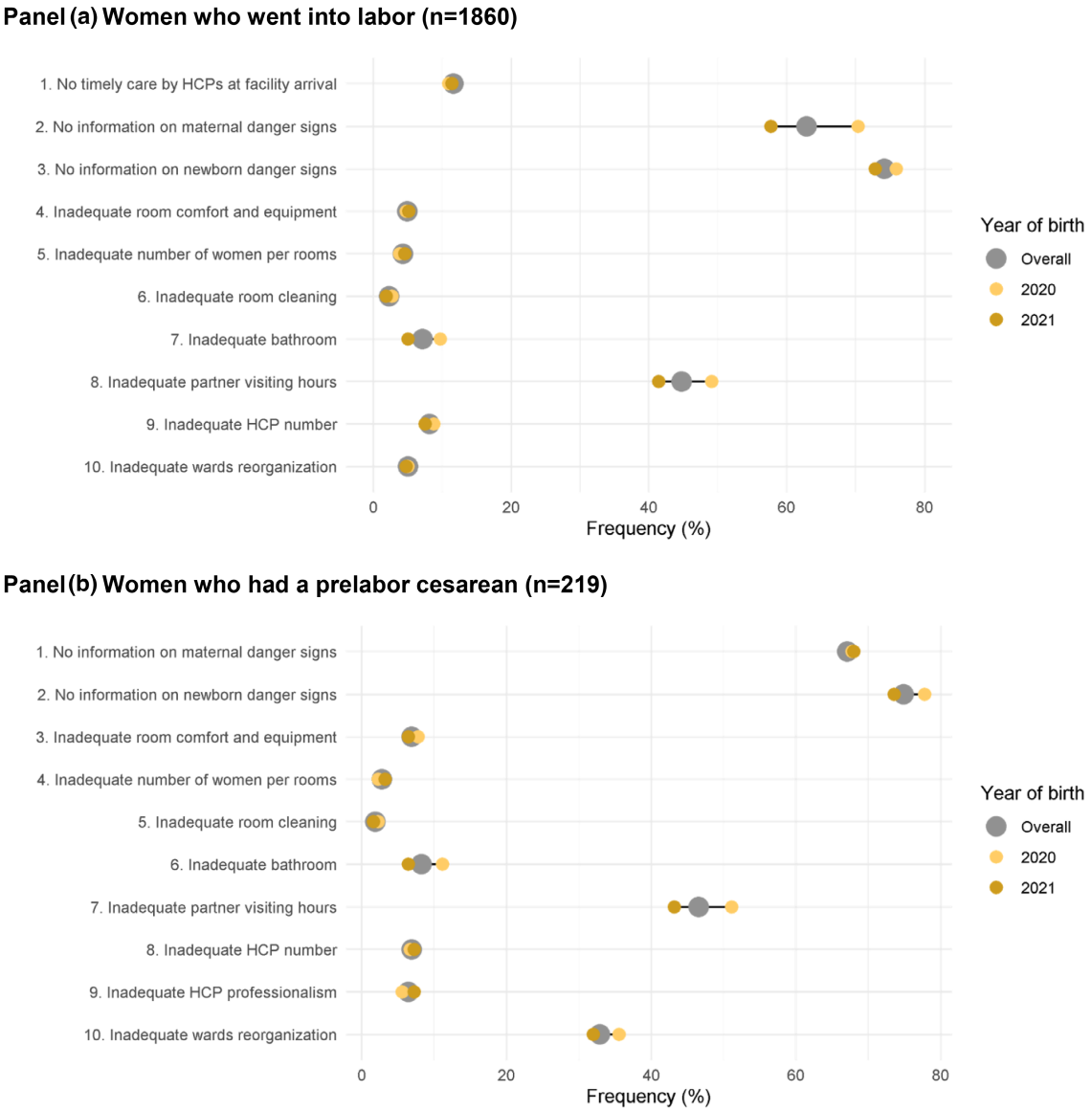

FIGURE 5 Availability of physical and human resources. (a) Women who went into labor ($n = 1860$). (b)Women who had a prelabor cesarean ($n = 219$). HCP, healthcare provider. *Note*: Data are reported as frequency on the total sample (gray dot) and as frequency on the sample of women giving birth in 2020 and 2021 (colored dots). The horizontal gray line represents the range of the frequencies. All the indicators in the domain of resources are directly based on WHO standards.

improvement in 2021 versus 2020, suggesting that further monitoring will be helpful.

Regarding women's experience of care, very little previous evidence is available for Latvia.[17,35] A number of studies from different settings worldwide, including high-income countries,[19,35–39] show that women are frequently subjected to improper care, such as receiving poor emotional support, enquiries are ignored or rejected, or experience of lack of privacy or other types of mistreatment and abuse, such as rude, insulting, and judgmental attitudes from all levels of healthcare staff. WHO recommends that every healthcare facility should provide respectful maternity care and effective communication, including sensitive, caring, and friendly attitudes from all healthcare personnel[40] and in general. A birth position of choice should be permitted,[40] and as much as possible, women should be actively involved in the decision-making process, with appropriate communication from healthcare providers, which increases trust in doctors.[37,38]

Regarding reorganizational changes due to COVID-19, in 2021 14.4% of women reported that healthcare personnel were still not always using PPE; it is essential to note that this is the first study that outlines such a problem in Latvia. In Latvia, by the end of 2021 more than 4300 people had died from COVID-19.[41] In this complex historical moment, when the COVID-19 pandemic had increased levels of stress for most pregnant women,[17] and when vaccine hesitancy and resistance to COVID-19 prevention measures have been a global problem, healthcare providers should be an example of good practices for all patients, particularly for prevention procedures that aim to protect both patients and colleagues.

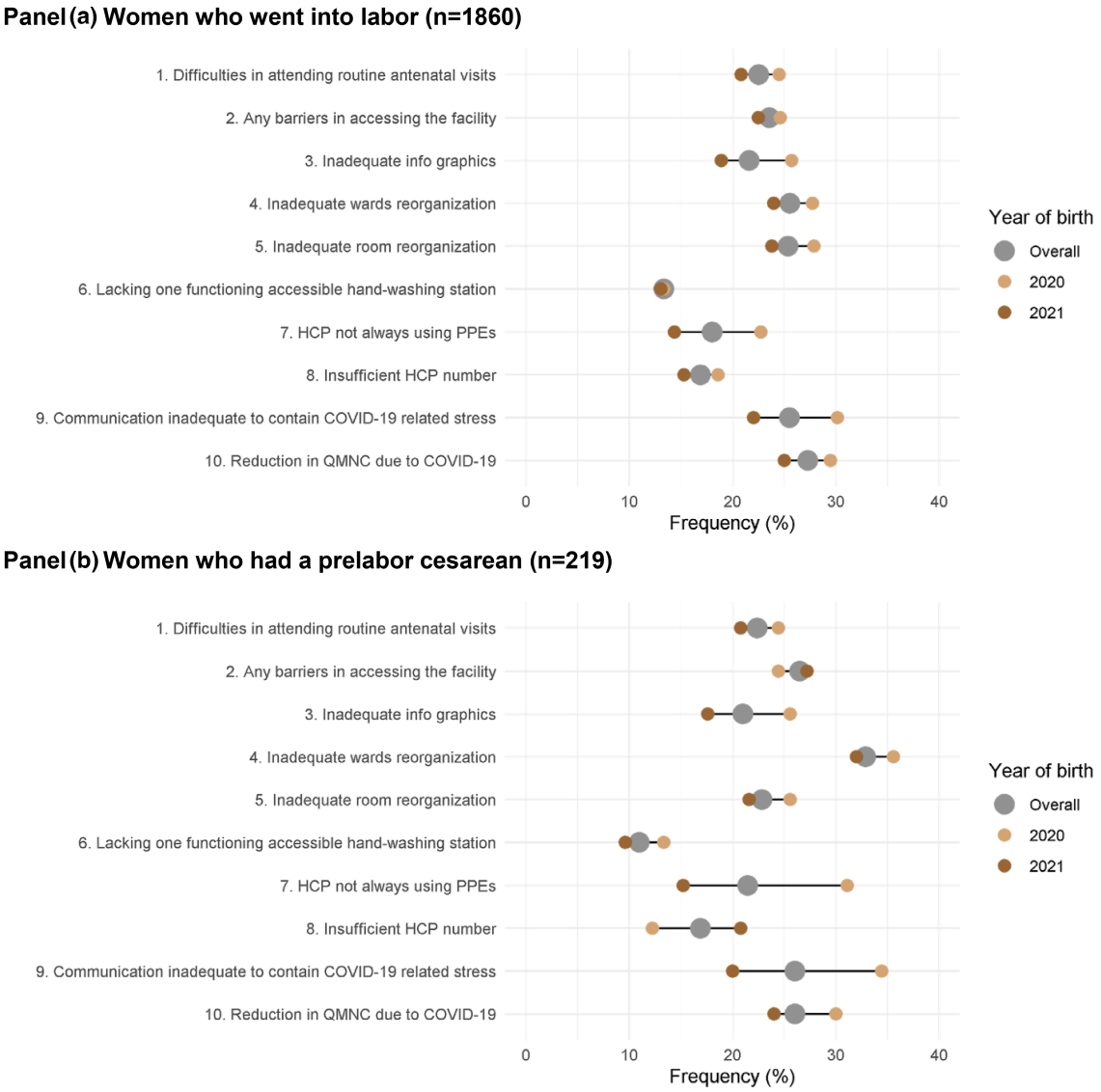

FIGURE 6 Reorganizational changes due to COVID-19. (a) Women who went into labor ($n = 1860$). (b) Women who had a prelabor cesarean ($n = 219$). HCP, healthcare provider; PPE, personal protective equipment; QMNC, quality of maternal and newborn care. *Note*: Data are reported as frequency on the total sample (gray dot) and as frequency on the sample of women giving birth in 2020 and 2021 (colored dots). The horizontal gray line represents the range of the frequencies. Indicator 6 in both panels was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the mother was hospitalized) supplied with water and soap or with disinfectant alcohol solution.

Notably, the availability of physical and human resources domain showed the lowest QMNC index across the four domains. Women were relatively satisfied regarding room comfort, number of women per room, room cleaning, and bathroom availability. However, it is alarming that in a very high percentage of cases (57.7%–77.8%), women did not receive information about maternal or newborn danger signs, with a higher frequency in the prelabor cesarean group and no significant changes between 2020 and 2021. Notably, quality measures were substandard in many other countries surveyed for the IMAgiNE EURO study.[23,28,29,42-45]

Overall results from this survey in Latvia show that there is room for substantial improvement. Multiple actions are urgently needed at different levels, such as ensuring an adequate number of skilled healthcare personnel, training on respectful woman-centered maternal care, development of informative materials for mothers, and other measures to improve the quality of care for mothers and newborns in Latvia. Monitoring of the key quality measures will be critical to evaluate the success of context-specific actions to improve quality of care in Latvia.

The main strengths of this study are the relatively high number of respondents, approximately 4%–7% out of all births in each year and the validated tools used for data collection, allowing comprehensive assessment of the QMNC.[25] Limitations of the IMAgiNE EURO survey have been acknowledged elsewhere.[23,28,29] Specific to Latvia, the data collection period (survey launched in June 2021) may have implied a recall bias: women who gave birth in 2020

TABLE 3 Multiple logistic regression comparing quality measures between women who went into labor ($n = 1860$) and women who had a prelabor cesarean ($n = 219$) when adjusted for year of labor and other sociodemographic variables[a,b,c,d]

Provision of care	Adjusted OR (95% CI)	*P* value	Experience of care	Adjusted OR (95% CI)	*P* value
1. No pain relief during birth	NA	NA	1. No freedom of movements during birth	NA	NA
2. Mode of birth	NA	NA	2a. No choice of birth position (in SVB)	NA	NA
2a. IVB	NA	NA			
2b. EC during birth					
3a. Episiotomy (in SVB)	NA	NA	2b. No consent requested (for IVB)	NA	NA
3b. Fundal pressure (in IVB)	NA	NA	2c. No information on newborn (at cesarean)	1.02 (0.65–1.58)	0.946
3c. No pain relief after cesarean	0.77 (0.34–1.76)	0.543	3. No clear/effective communication from HCP	1.14 (0.83–1.58)	0.426
4. No skin-to-skin contact	6.69 (4.65–6.62)	**<0.001**	4. No involvement in choices	1.06 (0.79–1.42)	0.700
5. No early breastfeeding	5.35 (3.52–8.14)	**<0.001**	5. Companionship not allowed	1.40 (1.04–1.88)	**0.027**
6. Inadequate breastfeeding support	1.58 (1.16–2.15)	**0.004**	6. Not treated with dignity	1.18 (0.83–1.66)	0.352
7. No rooming-in	3.14 (2.00–4.94)	**<0.001**	7. No emotional support	1.29 (0.95–1.77)	0.106
8. Not allowed to stay with the baby as wished	1.35 (0.61–3.01)	0.458	8. No privacy	0.85 (0.61–1.19)	0.354
9. No exclusive breastfeeding at discharge	1.76 (1.30–2.38)	**<0.001**	9. Abuse (physical/verbal / emotional)	1.17 (0.80–1.73)	0.420
10. No immediate attention when needed	1.55 (1.11–2.15)	**0.009**	10. Informal payment	1.83 (1.03–3.26)	**0.039**

Abbreviations: EC, emergency cesarean; HCP, healthcare provider; IVB, instrumental vaginal birth; PPE, personal protective equipment; QMNC, quality of maternal and newborn care; SVB, spontaneous vaginal birth.

[a]ORs were calculated taking women who underwent birth as the reference and adjusting for sociodemographic variables (i.e. year of childbirth, maternal age, maternal education, born in Latvia), parity, type of professional assisting the birth, newborn admission to neonatal intensive or semi-intensive care unit, and multiple birth.

[b]All the indicators in the domains of provision of care, experience of care, and resources are directly based on WHO standards. Indicators identified with letters (e.g. 3a, 3b) were tailored to take into account different mode of birth (i.e. spontaneous vaginal, instrumental vaginal, and cesarean). These were calculated on subsamples (e.g. 3a was calculated on spontaneous vaginal births; 3b was calculated on instrumental vaginal births).

[c]Indicator 6 in the domain of reorganizational changes due to COVID-19 was defined as: at least one functioning and accessible hand-washing station (near or inside the room where the woman was hospitalized) supplied with water and soap or with disinfectant alcohol solution.

[d]Bold values are statistically significant.

may have lost detailed memories, especially in cases of traumatic experiences[46]; surveying at regular intervals (every 4–6 months) would reduce this bias. Future studies could also consider collecting more detailed data on maternal and hospital characteristics. However, this should not limit taking action based on currently available data.

AUTHOR CONTRIBUTIONS

EP initiated this multicountry study in Latvia. DR, DJ, AV, GJS, and KPV were responsible for questionnaire translations, and promoted and supported the process of data collection. EP wrote the first draft of the manuscript with major inputs from all authors. IM analyzed the data. All authors approved the final version of the manuscript for submission.

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TABLE 3 (continued)

Availability of physical and human resources	Adjusted OR (95% CI)	*P* value	Reorganizational changes due to COVID-19	Adjusted OR (95% CI)	*P* value
1. No timely care by HCPs at facility arrival	1.26 (0.80–1.97)	0.312	1. Difficulties in attending routine antenatal visits	1.08 (0.76–1.52)	0.679
2. No information on maternal danger signs	1.37 (1.00–1.87)	**0.045**	2. Any barriers in accessing the facility	1.16 (0.84; –1.62)	0.365
3. No information on newborn danger signs	1.25 (0.89–1.75)	0.193	3. Inadequate info graphics	1.02 (0.72–1.46)	0.907
4. Inadequate room comfort and equipment	1.59 (0.89–2.83)	0.120	4. Inadequate ward reorganization	1.49 (1.09–2.03)	**0.012**
5. Inadequate number of women per rooms	0.66 (0.28–1.57)	0.350	5. Inadequate room reorganization	0.91 (0.64–1.28)	0.574
6. Inadequate room cleaning	0.97 (0.34–2.80)	0.959	6. Lack of one functioning accessible hand; washing station	0.91 (0.58–1.44)	0.701
7. Inadequate bathroom	1.12 (0.66–1.91)	0.665	7. HCP not always using PPE	1.41 (0.99–2.01)	0.058
8. Inadequate partner visiting hours	1.00 (0.74–1.34)	0.982	8. Insufficient HCP number	1.29 (0.88–1.91)	0.193
9. Inadequate HCP number	1.05 (0.59–1.84)	0.878	9. Communication inadequate to contain COVID-19-related stress	1.14 (0.82–1.59)	0.438
10. Inadequate HCP professionalism	1.62 (0.88–2.97)	0.120	10. Reduction in QMNC due to COVID-19	1.09 (0.79–1.52)	0.601

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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ETHICAL ASPECTS

The study was approved by Riga Stradins University Research Ethics Committee in Latvia (22–2/140/2021 16.03.2021) and by the Institutional Review Board of the coordinating center: IRCCS Burlo Garofolo Trieste (IRB-BURLO 05/2020 15.07.2020), as well as by ethical committees of other participating countries. Participation in the survey was entirely voluntary and anonymous. The right to reject participation in the survey, the study methodology, and the research objectives were described for participants and informed consent to participate in the study was requested to progress into the survey. All data were kept and analyzed in Italy (coordination center). Encryption was used to safeguard data transit and storage.

DATA AVAILABILITY STATEMENT

Data are available upon reasonable request to the corresponding author.

DISCLAIMER

The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

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