
Supplementary material

Supplementary Figure S1. Distribution of the number of pregnancy and birth-related changes among postpartum women during the third wave of the COVID-19 pandemic

Supplementary Figure S2. Proportion (%) of each experienced pregnancy and birth-related change among postpartum women during the third wave of the COVID-19 pandemic

Supplementary Figure S3. Distribution of the scores on EDS among postpartum women by changes in pregnancy and birth experience

Supplementary Figure S4. Distribution of total scores on EDS in postpartum women, categorized as either having presence of support or not at delivery

Supplementary Figure S5. Distribution of the scores on EDS-3A among postpartum women by changes in pregnancy and birth experience

Supplementary Figure S6. Distribution of total scores on EDS-3A in postpartum women, categorized as either having presence of support or not at delivery

Supplementary Table S1. Comparison between the general birthing population and the study sample of postpartum women for each country

Supplementary Table S2. Self-reported changes in pregnancy and birth management of postpartum women during the third wave of the COVID-19 pandemic by country

Supplementary Table S3. Representative statements to the open-ended questions regarding pregnancy and birth-related experiences

Supplementary Material S1. Postpartum-specific version of the survey relevant to this manuscript

Supplementary Material S2. Recruitment tools utilized and internet penetration rates

Supplementary Material S3. Overview of the infection and vaccination rates in each country during the study period 10 June and 22 August 2021

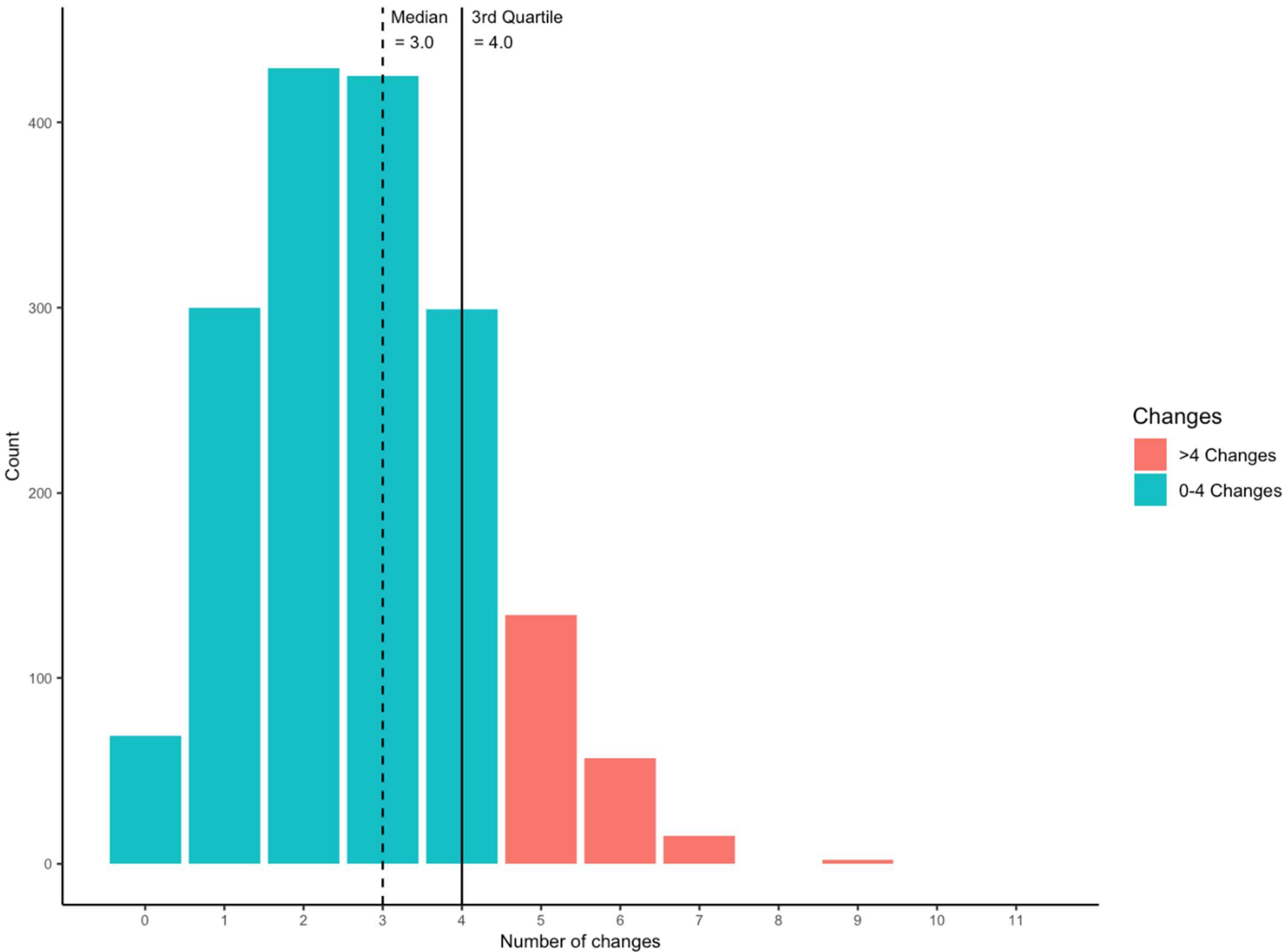


Figure S1. Distribution of the number of pregnancy and birth-related changes among postpartum women during the third wave of the COVID-19 pandemic.

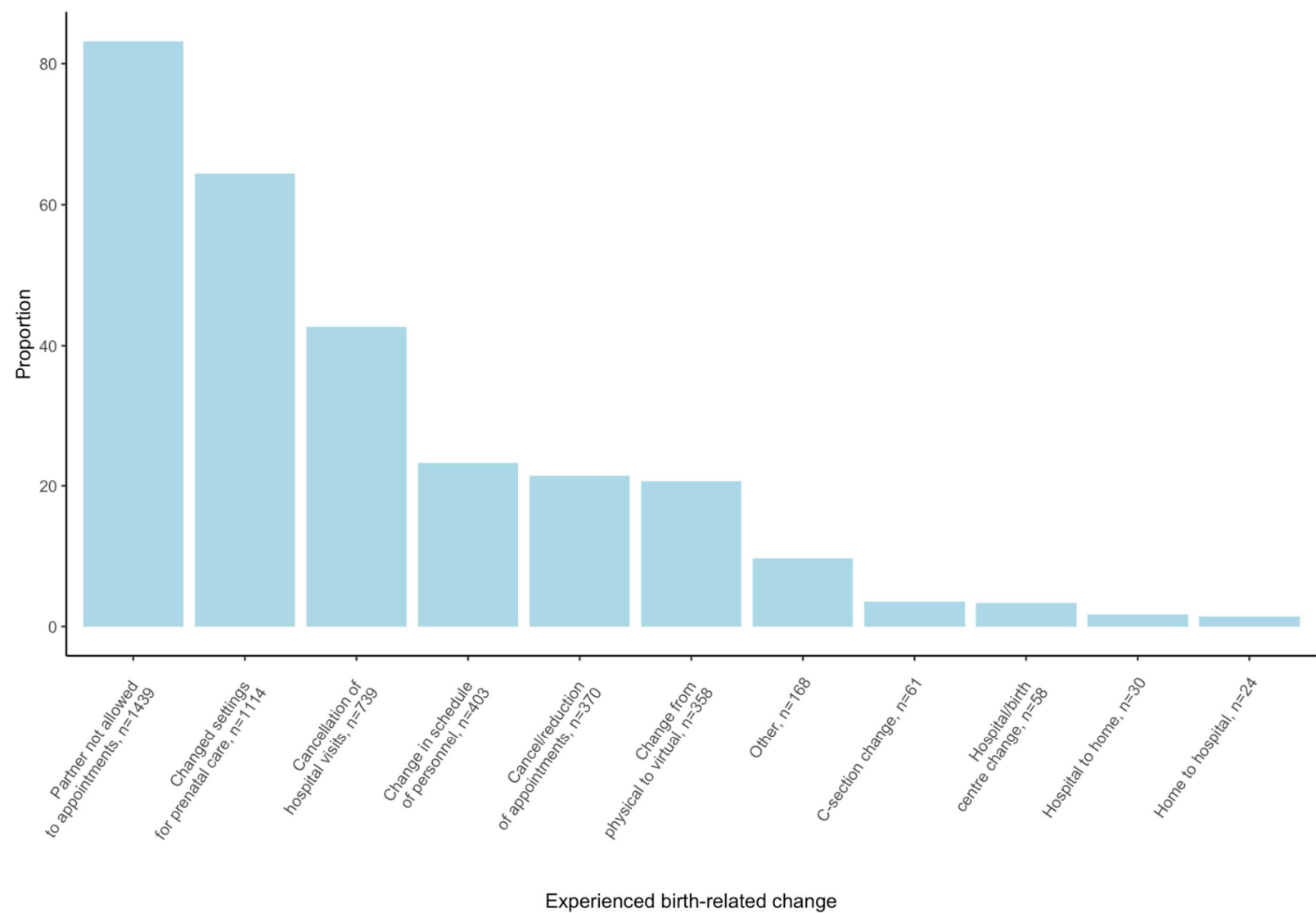


Figure S2. Proportion (%) of each experienced pregnancy and birth-related change among postpartum women during the third wave of the COVID-19 pandemic.

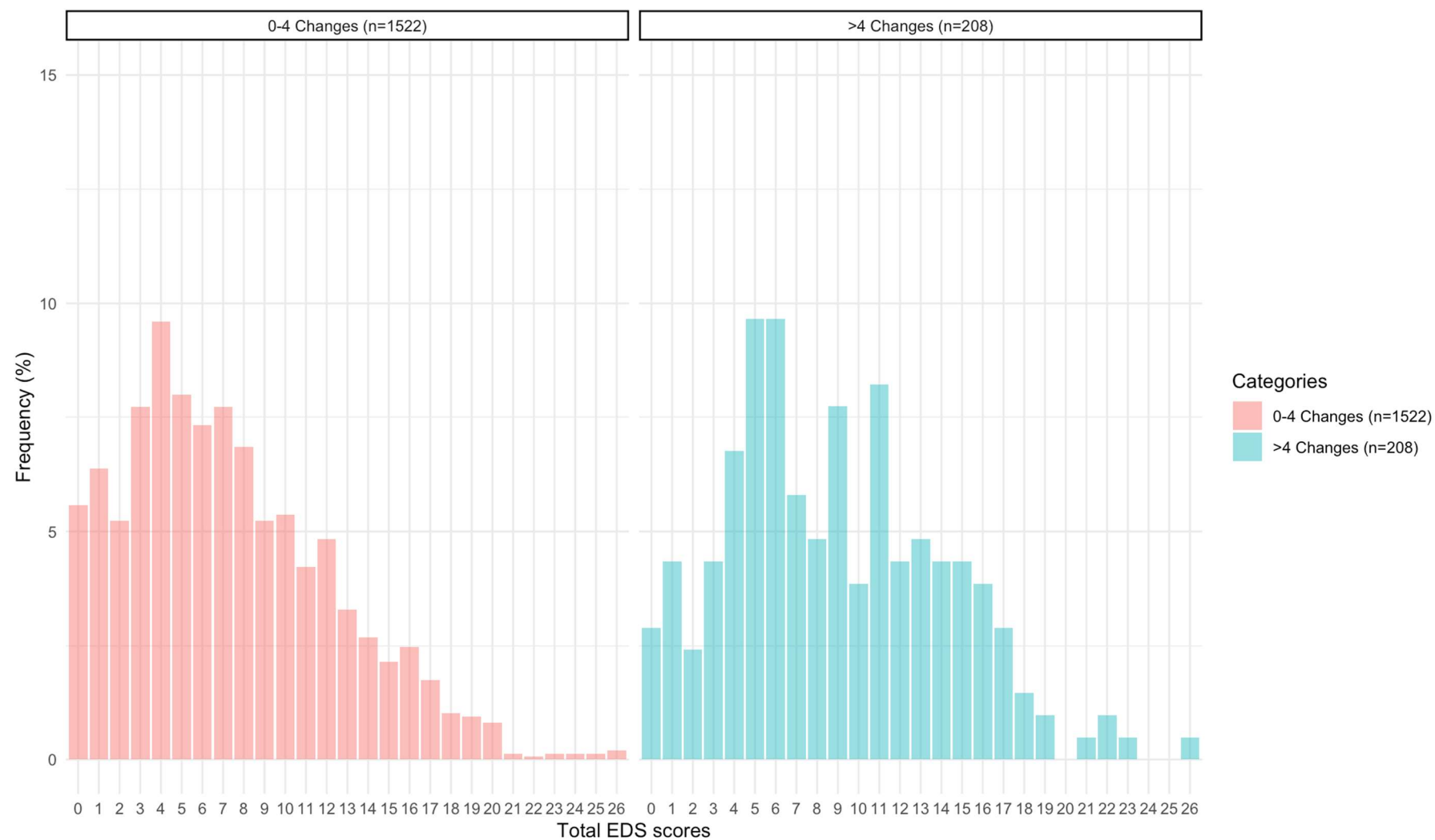


Figure S3. Distribution of total scores on EDS in postpartum women, categorized as either having 0-4 or >4 pregnancy and birth-related changes. EDS total scores range from 0 to 30, with score of ≥ 13 as a cut-off for symptoms of severe depression. Missing data: EDS 2.0%.

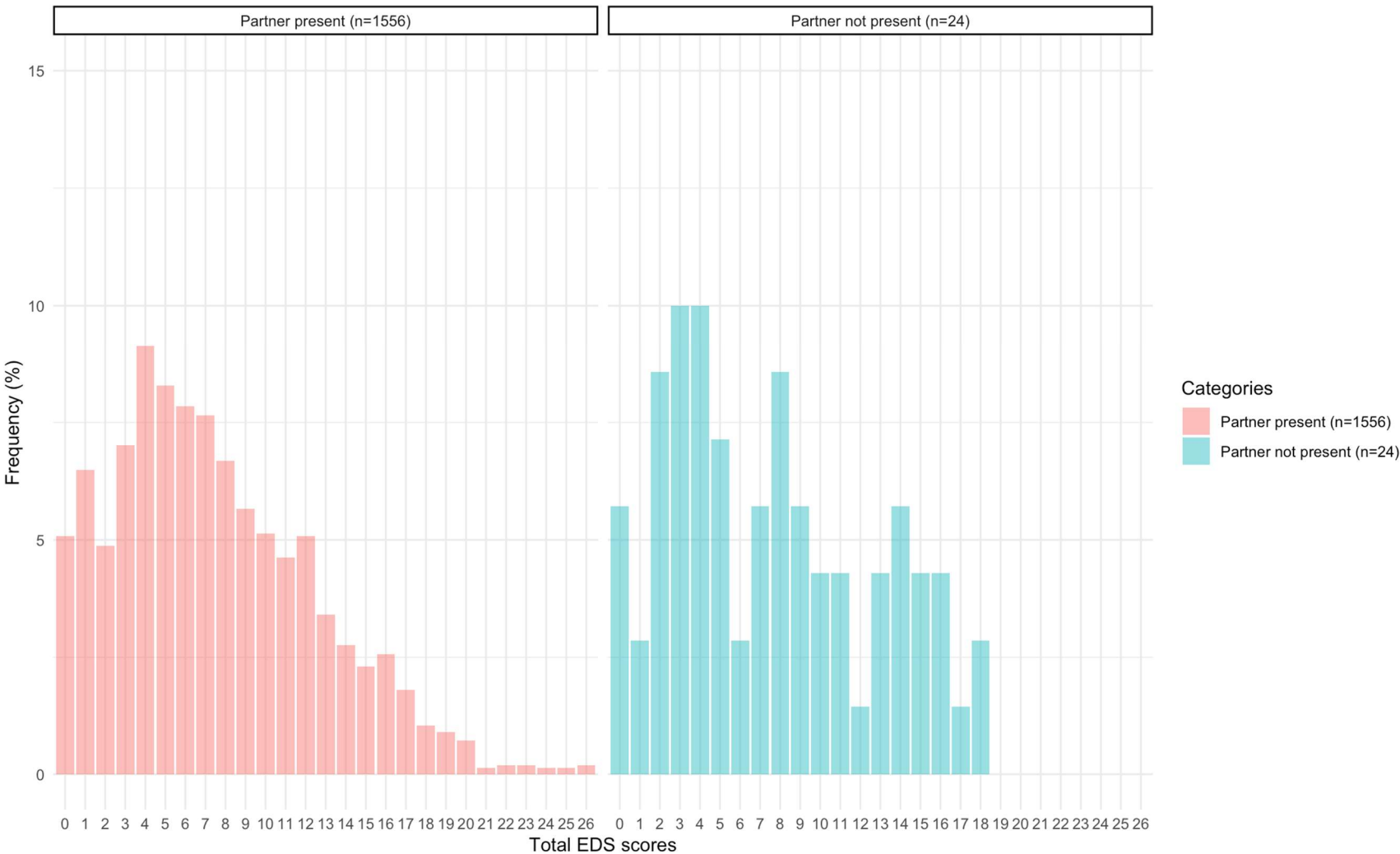


Figure S4. Distribution of total scores on EDS in postpartum women, categorized as either having presence of support or not at delivery. EDS scores range from 0 to 30, with scores of ≥ 13 as a cut-off for symptoms of severe depression. Missing data: EDS 2.0%.

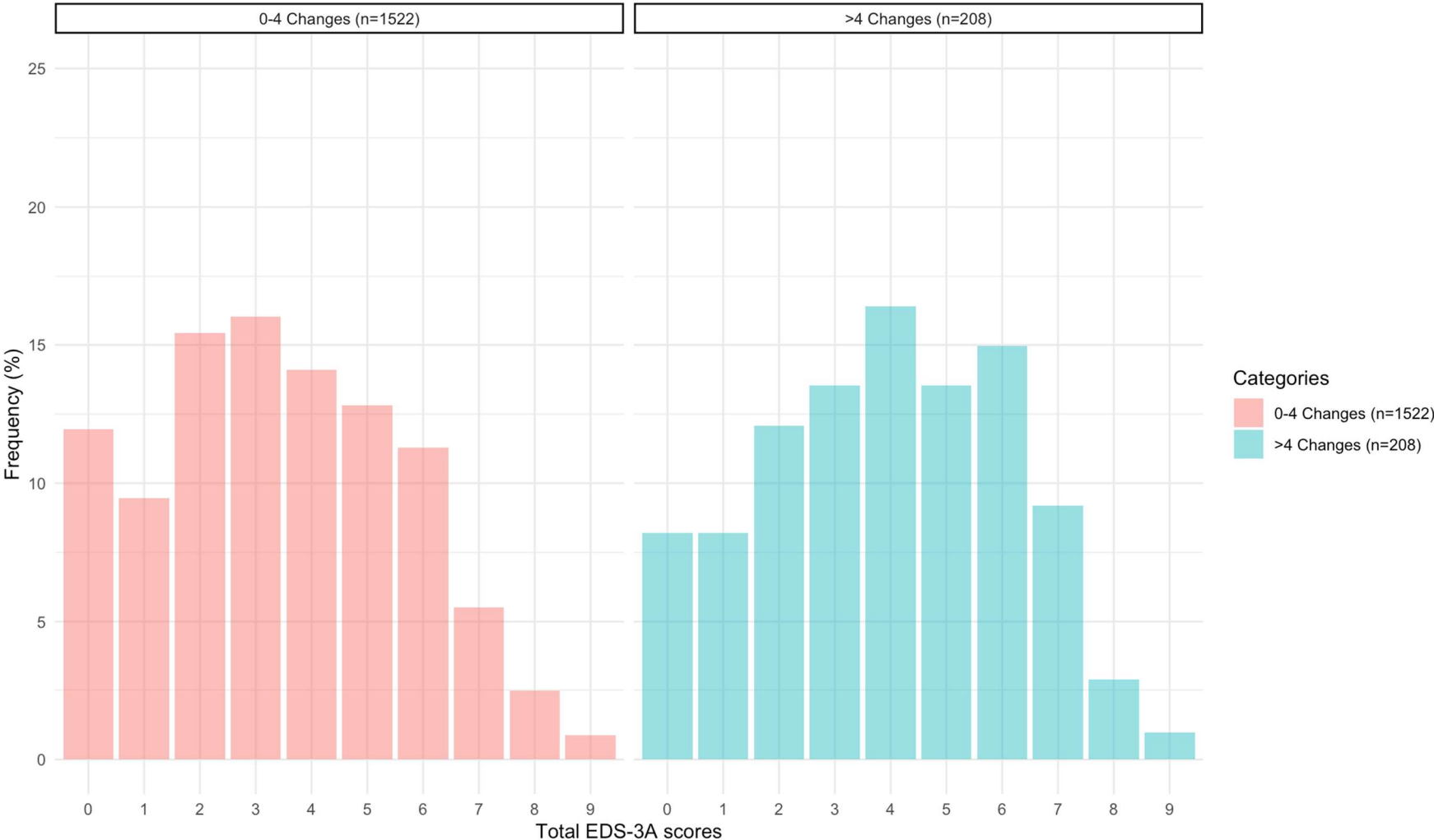


Figure S5. Distribution of total scores on EDS-3A in postpartum women, categorized as either having 0-4 or >4 pregnancy and birth-related change. EDS-3A scores range from 0-9, with score of ≥ 5 as a cut-off for symptoms of postnatal anxiety. Missing data: EDS 2.0%.

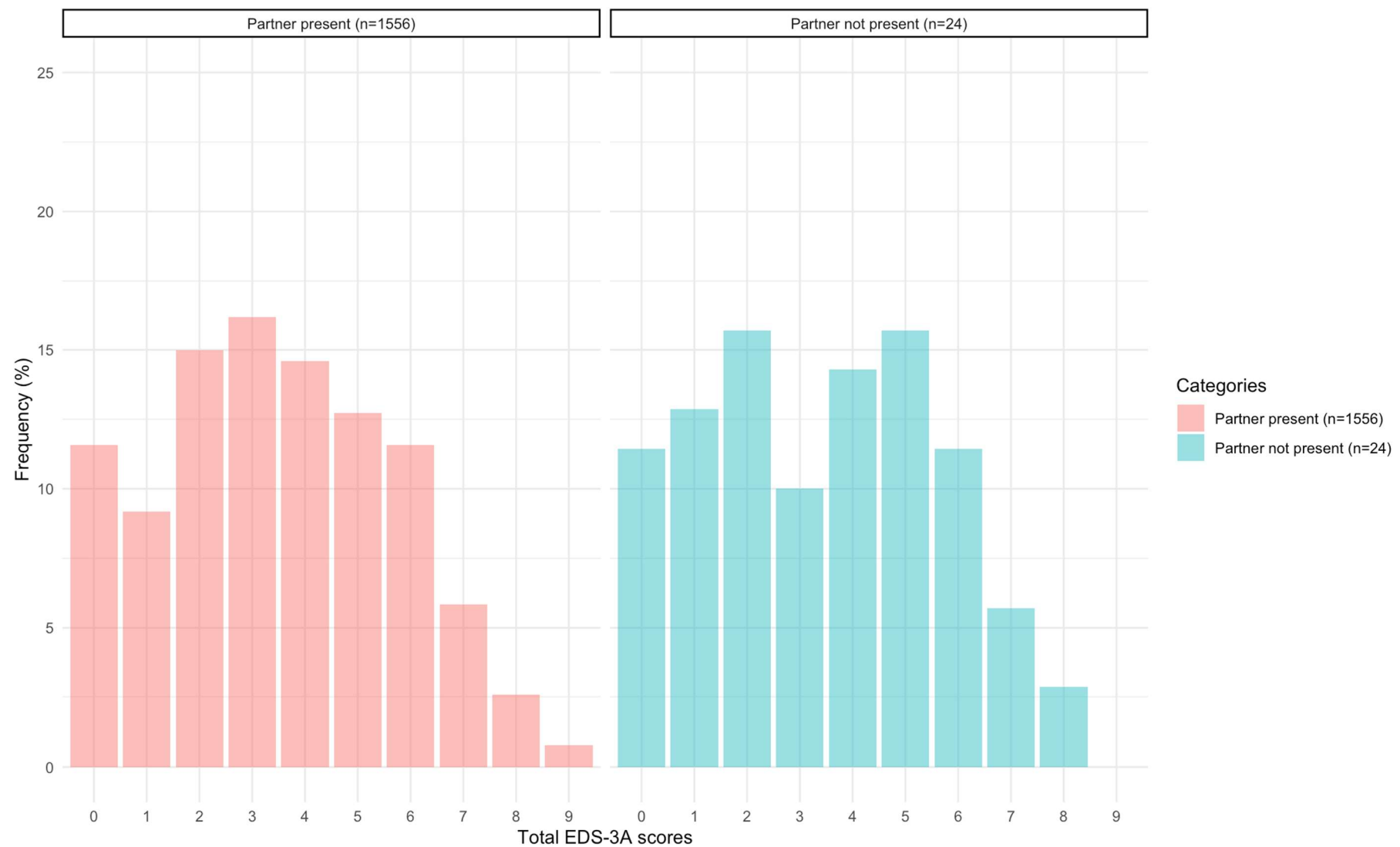


Figure S6. Distribution of total scores on EDS-3A in postpartum women, categorized as either having presence of support or not at delivery. EDS-3A scores range from 0-9, with score of ≥ 5 as a cut-off for symptoms of postnatal anxiety. Missing data: EDS 2.0%.

Table S1. Comparison between the general birthing population and the study sample of pregnant and postpartum women for each country.

	BELGIUM		NORWAY		THE NETHERLANDS		SWITZERLAND		UK	
	General ^a	Postpartum (n=235)	General ^b	Postpartum (n=1113)	General ^c	Postpartum (n=155)	General ^d	Postpartum (n=176)	General ^e	Postpartum (n=120)
Maternal age (years)										
18-25	10.0	3.0	8.4	7.5	8.3	0.0	7.5	0.6	22.7	2.5
26-30	33.7	25.1	30.7	40.0	29.3	20.0	26.4	14.2	28.6	17.5
31-35	38.1	40.0	38.4	39.6	39.9	33.5	39.9	37.5	29.4	25.8
36-40	14.8	7.7	18.3	11.0	18.9	14.2	21.8	19.3	15.7	14.2
> 40	3.4	1.3	4.1	2.0	3.7	4.5	4.4	4.5	3.6	3.3
Relationship status										
Partner	81.5	74.9	94.2	98.7	91.0	71.6	83.2	75.6	94.8	63.3
No partner	19.5	2.1	5.8	1.3	9.0	0.6	16.8	0.6	5.2	0.0
Professional status										
Professionally active	75.3	71.5	76.5	87.8	82.0	67.1	82.5	67.6	72.8	51.7
Education level										
Low	12.0	0.0	24.0	2.2	10.7	3.9	42.7	0.6	45.7	2.5
Medium	40.0	12.3	36.2	17.3	33.8	10.3	12.0	19.9	18.6	15.0
High	48.0	64.3	39.8	80.6	53.6	58.1	45.3	49.4	30.4	45.0
Smoking in pregnancy/ breastfeeding										
Yes	6.0	3.0	2.4/1.4 ^f	1.2	7.4	1.3	7.0	3.4	12.4	2.5
No	94.0	74.0	97.6/98.6 ^f	98.8	92.6	71.0	93.0	72.7	87.6	

Data are presented as %. N/A = not available. Numbers may not add up due to missing values. ^a**BELGIUM:** Statistics for the general birthing population were retrieved from Statbel (education level (25-44 years, 2019); professional status (25-49 years, 2016)), SPE (maternal age, 2020) and Sexpert (relationship status (18-39 years, 2013)). Age categories reported in the perinatal statistics report differ slightly from those reported in the table: <25 years, 25-29, 30-34, 35-39, >40. Smoking in pregnancy/breastfeeding has been estimated in the publication with PMID 31342605. ^b**NORWAY:** Statistics for the general birthing population in Norway were retrieved from the Medical Birth Registry of Norway in 2020 (age, relationship status, parity and smoking) (<http://statistikkbank.fhi.no/mfr/>). Official statistics from the Norwegian Medical Birth Registry have slightly different age categorizations; 18 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, and 40 to 44 years. Numbers reported follow this categorization. Statistics on educational level (women aged 16 years and older) were retrieved from Statistics Norway in 2020 (<https://www.ssb.no/en/utdanning/utdanningsniva/statistikk/befolkningens-utdanningsniva>); Low = below upper secondary education; Medium = upper secondary education & vocational education; High = higher education.

Statistics on professional status (women aged 25 – 39 years) were retrieved from Eurostat statistics (<https://ec.europa.eu/eurostat/>). ^c**THE NETHERLANDS:** Statistics for the general birthing population in the Netherlands were retrieved from Perined, the perinatal registry of the Netherlands (data for 2019) (maternal age, parity), from CBS StatLine, general statistics Netherlands (data for 2020) (education level, professional status and relationship status (2017)); and Trimbose Institute for mental health (data for 2018) (smoking in pregnancy). ^d**SWITZERLAND:** Statistics for the general birthing population in Switzerland were retrieved from the Federal Statistical Office (FSO) in 2020 for maternal age, relationship status (aged 25–44 years), professional status (aged 25–54 years), education level (aged 25–34 years) and 2018 for parity (aged 25–44 years) (<https://www.bfs.admin.ch>). Smoking in pregnancy in Switzerland has been monitored on behalf of FSO between 2011 and 2016 (<https://www.info-set.ch/fr/tabac.html>). ^e**UK:** Statistics for the general birthing population are retrieved from various datasets provided by: (i) the Office of National Statistics including Conception Statistics for England and Wales (maternal age and relationship status – data from 2018), Labour Market Statistics (educational attainment in men and women aged 16–49 – data from 2011, and professional status in women aged 16–64 – data from Jan to Jun 2020) and Adult Smoking Habits in England (women aged 16–49 – data from 2019); (ii) NHS Digital Hospital Episode Statistics NHS Maternity Statistics (smoking at booking appointment – data from 2018–19); and (iii) population-based published estimates (maternal parity – PMID: 30464639). ^fstart of pregnancy/end of pregnancy. Missing data: Belgium (23.0%), Switzerland (23.9% - 24.4%), The Netherlands (27.7%), The UK (36.7% - 43.3%).

Table S2. Self-reported changes in pregnancy and birth related experiences of postpartum women during the third wave of the COVID-19 pandemic by country.

	Total	Country				
	n=1730	Norway n=1113	Belgium n=213	Switzerland n=160	Netherlands n=146	UK n=98
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Partner not allowed to attend pregnancy care appointments (e.g., ultrasound)	1439 (83.2)	1000 (89.8)	152 (71.4)	99 (61.9)	115 (78.8)	73 (74.5)
Changed settings for prenatal care (e.g., no more group classes)	1114 (64.4)	735 (66.0)	142 (66.7)	107 (66.9)	85 (58.2)	45 (45.9)
Cancellation of hospital visits for information	739 (42.7)	498 (44.7)	103 (48.4)	83 (51.9)	37 (25.3)	18 (18.4)
Change in schedule of persons (e.g., midwife, gynaecologist) providing pregnancy care	403 (23.3)	324 (29.1)	27 (12.7)	11 (6.9)	18 (12.3)	23 (23.5)

Cancellation or reduction of appointments for prenatal examination	370 (21.4)	217 (19.5)	32 (15.0)	16 (10.0)	61 (41.8)	44 (44.9)
Change from in-person prenatal visits to virtual visits	358 (20.7)	234 (21.0)	46 (21.6)	14 (8.8)	31 (21.2)	33 (33.7)
Other ^a	168 (9.7)	109 (9.8)	18 (8.5)	22 (13.8)	9 (6.2)	10 (10.2)
No pregnancy and birth-related change	80 (4.6)	32 (2.9)	16 (7.5)	13 (8.1)	8 (5.5)	11 (11.2)
Change in schedule for C-section or induction of labour	61 (3.5)	39 (3.5)	7 (3.3)	3 (1.9)	6 (4.1)	6 (6.1)
Change of plan: from one selected hospital/birth centre to another	58 (3.4)	34 (3.1)	12 (5.6)	6 (3.8)	4 (2.7)	2 (2.0)
Change of plan: from hospital birth to home birth	30 (1.7)	4 (0.4)	8 (3.8)	1 (0.6)	14 (9.6)	3 (3.1)
Change of plan: from home birth to hospital birth	24 (1.4)	8 (0.7)	4 (1.9)	1 (0.6)	8 (5.5)	3 (3.1)

^aOther include open-ended answers (see Supplementary Table 3).

Table S3. Representative statements to the open-ended questions regarding pregnancy and birth-related experiences.

UK	“Restricted visiting for partners on the post natal ward has affected my decision on where to give birth. Some hospitals still insisting masks to be worn during c-section and support partners not allowed in hospital unless woman is in active labour.” “My partner could not stay with me after I gave birth.” “I had to miscarry alone.”
Norway	“Unfortunately, my husband was only able to join during the active birth, which was emotionally devastating. The initial birth process took many days, and I had to go through that process alone.”

	“My partner was indispensable during the delivery. I spent a few hours alone when I was contracting, as he was not allowed to be there at the time. Mentally, that was more exhausting than the physical discomfort.” “Home birth became an alternative, as the delivery ward would not allow my partner to attend the childbirth. The pregnancy and delivery became a fantastic process and experience, as I really worked to comprehend what it meant physically and mentally. I ‘owned’ my own delivery.”
Belgium	“My partner was not allowed to be present in the hospital at the time of the embryo transfer, as part of our fertility treatment.” “We were offered Zoom sessions on ‘breastfeeding’ and ‘labor and delivery’ instead of real-life information sessions in the hospital.” “At the entrance of the hospital, we had to justify to the reception employee that I had a miscarriage as my partner was with me.”
Switzerland	“My partner was not authorized to attend the morphologic ultrasound; his presence was allowed in certain hospital wards and not others which was incoherent.” “No visit from the father after the delivery, this should have never happened this way. It is inhumane to steal these unique moments from a father! The mother needs support. Delivering is physiological but it is upsetting! What happened was inadmissible.”
The Netherlands	“Bath birth was no longer allowed” “My biggest fear was that my partner couldn't be at the birth because he would have corona, so we went into a mini quarantine a few weeks before the due date (limited contacts, working from home even more, avoiding supermarket crowds, etc).”

	“My partner was not allowed to go to the intake in the hospital for induced labour when approaching the 42-week limit.” “Only my partner was allowed to have the caesarean section and then in the hospital. No visitors were allowed.”
--	---

Material S1: Postpartum-specific version of the survey relevant to this manuscript.

1. Please indicate the age of your baby.
 - a. 6 weeks
 - b. Between 6 weeks and 12 weeks

2. Are you currently breastfeeding and/or giving expressed milk?
 - a. Yes
 - b. No

3. Did you ever breastfeed / give expressed milk before the coronavirus outbreak?
 - a. Yes
 - b. No

Coronavirus infection

In this section, you will be asked whether you and members of your household / close family have been infected with the new coronavirus and how it was diagnosed.

4. Did you have a positive test for a coronavirus (SARS-CoV-2) infection?
 - a. Yes
 - b. No

5. Do you believe you were infected with the coronavirus although not confirmed by a test?

- a. Yes
- b. No

6. Has any member(s) of your household or close family tested positive for the coronavirus since the start of the pandemic?

- a. Yes
- b. No

Covid-19 and disease severity

In this section, you will be asked how COVID-19 affected you and the members of your household / family personally.

7. Can you specify the severity of the coronavirus infection (COVID-19) that affected you? You can indicate multiple answers.

- a. I have/had no or mild symptoms
- b. I have/had moderate symptoms
- c. I have/had long-term symptoms (sequelae) of the disease
- d. I was hospitalised but not in an intensive care unit (ICU)
- e. I was hospitalised in an intensive care unit (ICU)

Coronavirus and your birth experience

8. Which of the following changes are you experiencing or have experienced during the COVID-19 outbreak?

- a. Change in schedule for C-section or induced labour
- b. Change of plan: from home birth to hospital birth
- c. Change of plan: from hospital birth to home birth
- d. Change of plan: from one selected hospital/birth centre to another
- e. Change in schedule of persons providing pregnancy care (e.g., midwife, gynaecologist)

- f. Cancellation or reduction of appointments for prenatal examination
- g. Changed settings for prenatal care (e.g., no more group classes)
- h. Partner not allowed to accompany me to pregnancy care appointments (e.g., ultrasound)
- i. Cancellation of hospital visits for information
- j. Change from in-person prenatal visits to virtual visits
- k. Other
- l. None

9. Apart from medical staff, who was with you during your delivery? You can indicate multiple answers.

- a. Partner
- b. Friend
- c. Relative
- d. Other
- e. Nobody

Coronavirus and your wellbeing

10. We would like to know how you are feeling. Please indicate the answer, which comes closest to how you have felt in the past 7 days, not just how you feel today.

In this section of the questionnaire - the Edinburgh Postnatal Depression Scale (EPDS) was presented (Cox J, Holden J, Sagovsky R. Detection of postnatal depression. Development of the 10-item edinburgh postnatal depression scale. The British Journal of Psychiatry. 1987 June 1, 1987;150(6):782-6).

11. Please indicate the answer which comes closest to how you have felt in the past 14 days.

Over the last 14 days, how often have you been bothered by the following problems?

In this section of the questionnaire - Generalized Anxiety Disorder 7-item scale (GAD-7) was presented (Spitzer RL, Kroenke K, Williams JBW, Löwe B. A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. Archives of Internal Medicine. 2006;166(10):1092-7).

12. Please indicate for which chronic illnesses you have used a medication in the past 3 months? (i.e., chronic illnesses are conditions that already existed before your pregnancy/postpartum) (multiple answers possible)?

- a. Asthma
- b. Allergy
- c. Cardiovascular disease (e.g., high blood pressure, high cholesterol, heart disease, etc.)
- d. Depression
- e. Diabetes
- f. Epilepsy
- g. Hypothyroidism (underactive thyroid)
- h. Rheumatic diseases (including rheumatoid arthritis, psoriatic arthritis, etc.)
- i. Inflammatory bowel disease (including Crohn's disease, Ulcerative colitis, etc.)
- j. Anxiety
- k. Other:
- l. None of the above

Personal background

In this final section, you will be asked a few questions about yourself as a participant of this study.

13. Year of birth? (Dropdown menu)

14. Where do you live? (country-specific adaption is needed for this question)

15. Do you currently have a partner?

- a. Yes
- b. No

16. Did you smoke before you got pregnant?

- a. Yes
- b. No

17. Have you smoked since you found out you were pregnant?

- a. Yes
- b. No

18. What is your highest level of education?

- a. Primary education
- b. Professional secondary education
- c. Technical secondary education
- d. Artistic secondary education
- e. General secondary education
- f. Professional bachelor
- g. Academic bachelor
- h. Master
- i. PhD

j. Other:

19. What is your current professional status? (if you are currently not working because of pregnancy complications or maternity leave, please fill in the professional status you had before)

a. Employee

Are/were you working in healthcare?

Does your employment put you at increased risk of catching COVID-19?

b. Self-employed

Are/were you working in healthcare?

Does your employment put you at increased risk of catching COVID-19?

c. Civil service employee

Are/were you working in healthcare?

Does your employment put you at increased risk of catching COVID-19?

d. Student

Are you following an education in healthcare?

e. Homemaker

f. Jobseeker/unemployed

g. Incapacitated/disabled

h. Other:

Are/were you working in healthcare?

Does your employment put you at increased risk of catching COVID-19?

20. Finally, the coronavirus pandemic affected many people in many different ways, both negatively and/or positively. Please share any of your personal experiences or anything that has changed in your life due to the pandemic (optional question).

Material S2 Recruitment tools utilized and internet penetration rates.

Country	Recruitment tools			Internet penetration rates (%)
	Websites	Social media	Apps	
UK	www.medicinesinpregnancy.org (i.e. the UKTIS patient facing website)	Twitter (UKTIS account); Facebook (local maternity/mother and baby groups)	N/A	99.3 ¹
Norway	www.altformamma.no (i.e. pregnancy website)	Facebook (e.g., Gravid i coronatider); pregnancy forums (e.g., Termin september 2020)	Mobile application (Helseappen).	99.0 ²
Belgium	www.gezondzwangerworden.be ; and websites of perinatal organizations, midwives, lactation consultants, pharmacies	Facebook	N/A	96.0 ³
Switzerland	www.letsfamily.ch ; www.chuv.ch ; www.swissmom.ch ; www.medela.ch ; pregnancy forums	Facebook Twitter	N/A	95.0 ⁴
The Netherlands	www.consumentenbond.nl ; www.24baby.nl ; website for midwives (www.deverloeskundige.nl); Lareb website (www.lareb.nl and www.lareb.nl/tis-knowledge).	Facebook (e.g., ik ben zwanger, kindje klein)	N/A	94.2 ⁵

Sources of internet penetration rates: ¹ Statistics UK (<https://www.ons.gov.uk>); ² Statistics Norway (<https://www.ssb.no/en>); ³ Statistics Flanders, Belgium (www.statistiekvlaanderen.be); ⁴ Statistics Switzerland (www.bfs.admin.ch); ⁵ Statistics Netherlands (www.statistica.com); N/A = not applicable

Material S3. Overview of the infection and vaccination rates in each country during the study period 10 June and 22 August 2021.

Country	Data collection period (2021)	First reported COVID-19	Infection rates as	Percentage of the population (>18 years)
---------	-------------------------------	-------------------------	--------------------	--

		case/death (2020)	inhabitants infected/day (July 1st 2021)	with one vaccination dose (1 dose/ 2 doses) (July 1st 2021)
UK	14 June – 30 July	31 Jan/5 Mar	26527	85% / 63%
Norway	01 June – 24 July	26 Feb/12 Mar	192	51% / 29%
Belgium	10 June - 18 July	04 Feb/11 Mar	670	64% / 44%
Switzerland	14 June – 22 Aug	27 Feb/6 Mar	172	51% / 37%
The Netherlands	11 June – 18 July	27 Feb/6 Mar	1044	72% / 41%