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Original Article

Improving prenatal care during lockdown: Comparing telehealth and in-person care for low-risk pregnant women in the PROTECT pilot study

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ABSTRACT

Objective: to compare telehealth and in-person care during the COVID-19 lockdown in a population of low-risk pregnant women for prenatal care received and perinatal outcome.
Methods: This single-center study began during the first French lockdown in 2020. Women with at least one telehealth (remote) prenatal care visit were compared with those who received care only in person. Data include results from self-administered surveys and perinatal outcomes. The main outcome was the prenatal care experience, assessed by the 5-point Quality of Prenatal Care Questionnaire (QPCQ) score. Exploratory analyses sought to identify connections between perinatal outcomes and any of their levels of QPCQ score, health/eHealth literacy, stress, and social deprivation scores .
Results: The experimental group included 55 women and the control group 52. Maternal and neonatal outcomes were similar in both groups. The mean QPCQ scores did not support any difference between the mothers' experience of prenatal care in each group: 4.15±0.52 in the telehealth and 4.26±0.63 in the in-person groups. Similarly, levels of social deprivation, stress, and health and eHealth literacy did not differ between the groups.
Conclusion: Regardless of social deprivation or literacy level, both telehealth and in-person monitoring appeared to provide equivalent and good-quality prenatal care experiences during the pandemic, ClinicalTrial.gov registration NCT04368832 (30th April 2020)

Introduction

French health authorities recommend 7 prenatal care visits for pregnant women. These consultations are intended to optimize the screening of maternal, obstetric, and fetal complications and to adapt care and management as needed [1]. In France, both physicians and midwives provide this ongoing care for low-risk pregnancies, while also providing counseling, prevention, parental support, and psychosocial risk assessment [2].

Implementation of the lockdown on March 16, 2020, due to the COVID-19 pandemic, required an urgent reassessment of the risk-benefit balance of this care because of the associated potential contamination risk for women, co-parents, and health care professionals [3]. As a result, hospitals, other health facilities, and self-employed health care professionals had to make rapid and unplanned changes to manage low-risk pregnancies. The widespread adoption of telehealth visits (by telephone or videoconference) thus raised numerous questions about its indications and limitations [4–6].

Various research studies have already highlighted telehealth's acceptability and feasibility for managing specific diseases [7]. However, before this pandemic, prenatal care experiments mainlyinvolved mainly the promotion of physical activity, support for smoking cessation, facilitation of access to primary care in low-income areas, and modes of monitoring high-risk pregnancies [8–11]. These findings cannot be transferred to the context of overall low-risk pregnancy management, for which new and efficient methods are needed to assess its impact on women's experience and safety. In the past few years, perinatal research has focused on the impact of interventions by physicians and midwives on women's

Abbreviations: QPCQ, Quality of Prenatal Care Questionnaire; PROTECT, imPROving prenaTal carE during ConfinemenT; HLQ, Health Literacy Questionnaire; eHLQ, eHealth Literacy Questionnaire

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experience of the quality of prenatal care.. A specific questionnaire (Quality of Prenatal Care Questionnaire, QPCQ) has been developed and tested for this purpose in English, Brazilian, and French versions [12–15]. Its use in assessing prenatal care allows comparisons with prepandemic data. To our knowledge, however, no research team ever used this tool to assess telehealth use for complete prenatal care of low-risk pregnancies. An assessment of maternal and neonatal outcomes is also needed to assess the clinical impact of this care.

In a strict lockdown environment, the telehealth alternative involved significantly different constraints than those required for in-person care that enables physical distancing, systematic decontamination, and the avoidance of the physical presence of co-parents, interpreters, and trainees. Some health care facilities (including the offices of self-employed physicians and midwives) chose these added constraints, when telehealth was unsuitable because of inadequate access to the necessary telecommunication tools, a language barrier with the patient, or psychosocial issues. The unprecedented nature of this event made it impossible to anticipate the acceptability of these changes or their impact on care.

Accompanying these shifts were significant changes in access to emergency services and unexpected modifications in health outcome indicators for pregnant women, particularly the incidence of preterm births and mental health problems, and dietary intake [16–20]. The effect of these multifaceted changes on prenatal care quality was probably also connected to women's social deprivation and health literacy levels. Literacy and digital-health literacy refers to the cognitive and social skills that motivate and enable individuals to acquire, understand, and use the information and the numeric information to safeguard and promote their health. It is likely that health literacy and digital-health literacy influenced women's ability to adapt to rapid changes in care during this pandemic episode.

This study aimed to compare telehealth and in-person ongoing prenatal care in a low-risk population, by questioning them about their experience of prenatal care quality (QPCQ), features of this care, and both maternal and neonatal outcomes. The data we collected also aimed to explore connections between these endpoints and the women's background through health/digital health literacy levels, stress levels, and social deprivation levels.

Methods

The PROTECT (imPROving prenaTal carE during ConfinemenT) study applied a single-center quasi-experimental (non-randomized) approach designed after the announcement of the first French national lockdown decision. This initial lockdown ran from March 17 to May 10, 2020. The pilot study was launched in April 2020 among low-risk pregnant women in an area where COVID-19 struck early and hard (the *Grand Est*). Within days of the lockdown, national health authorities had transmitted to French medical professionals instructions about restrictions on in-person consultations and the possibility of using telehealth for prenatal care. Locally, pregnant women were generally offered a choice between the two options, although some professionals limited their choice to only one of the alternatives. The standard laboratory tests, blood pressure measurements, and screening tests (ultrasounds and others for Down syndrome) were not supposed to be postponed in case of telehealth. Theycould be performed at any local facility (private facilities or hospitals).

Participants

Posters and flyers transmitted by the local perinatal network informed women about the aims and procedures of the PROTECT study. Women planning to give birth in the regional university maternity ward were then recruited as volunteers. The inclusion criteria were: absence of any factors suggesting a high-risk pregnancy, age older than 18 years, gestational age > 7 weeks when lockdown began, at least one medical consultation (remote or in-person) during lockdown with a midwife or physician (in private practice, that is, self-employed, or employed at a maternity hospital), confirmed health insurance coverage, and proficiency in speaking and writing French (able to complete the self-administered questionnaires). Women with a multiple pregnancy, seeking an abortion, carrying a fetus with a congenital defect, imprisoned, or with psychiatric disorders were excluded. Women who agreed to participate were interviewed by telephone at enrolment by a research midwife (LA or GA) to confirm their participation and ensure they had received complete information about the study. Participation in the study was voluntary, and no financial or other compensation was offered. Women who finally gave birth elsewhere than in the university maternity ward were excluded.

Data collection procedures

Women in the telehealth (experimental) group had at least one remote (telephone or videoconference) consultation during the first lockdown, while women in the in-person (control) group were seen only in person, under the applicable health restrictions: no co-parents or other companions allowed at visits, physical distancing, masking, and travel restrictions). Within each group, enrolments were classified into 3 subgroups, based on trimester of pregnancy at inclusion (T1, T2, and T3), and data were collected to reflect the prenatal care experience for each preceding trimester. The surveys about the first and second trimester experiences were sent by email, with telephone reminders if not submitted at the indicated times for data collection. A research midwife (SB) administered the final survey (third-trimester experience) during the postpartum stay.

Outcomes

The first part of the survey included four validated questionnaires to assess women's background: EPICES social deprivation score [21], Perceived Stress Scale, Health Literacy Questionnaire (HLQ) [22], and the eHealth Literacy Questionnaire (eHLQ) [23] to assess women's pre-existing health and digital-health literacy.

The second part included the previously published Quality of Prenatal Care Questionnaire (QPCQ) to obtain the mother's experience of prenatal care. This 46-item score comprises 6 validated subscales: 1. information sharing, 2. anticipatory guidance, 3. sufficient time, 4. approachability, 5. availability, and 6. support and respect.

Each survey also contained direct questions asking whether women or health care professionals had requested postponements or additional appointments and questions about women's preferences for future obstetric care.

After childbirth, we collected antenatal, maternal, and neonatal outcomes, based on the core set published in the COMET initiative [21]. The different endpoints were grouped into two composite outcomes defining prenatal complications and postpartum adverse outcomes.

Sample size

In the complete absence of data regarding low-risk prenatal care during the lockdown, it was impossible to anticipate whether telehealth was likely to prove superior, inferior, or non-inferior to the in-person care with its constraints. Based on previous QPCQ score data in Canadian, Australian, and Brazilian populations, we considered a QPCQ score difference of 0.5relevant for this pilot exploratory analysis [12–15]. To show this difference of 0.5 in QPCQ scores (range 0-5) between the two groups, with a standard deviation of 0.7, a power of 90% and a two-sided alpha risk, and taking into account a 10% risk of loss to follow-up, the enrollment 108 women, i.e., 54 women in each

group was initially planed This sample size calculation did not consider the perspective of a rapid removal of lockdown and its subsequent interruption of enrollments.

Statistical analysis

Descriptive analyses reported continuous (quantitative) variables as means with their standard deviations, and categorical (qualitative) variables as numbers and percentages.

For comparisons, parametric tests were used (Student t test or 1-factor analysis for the continuous variables, and Chi-square tests for the categorical variables). Non-parametric tests such as the Wilcoxon or Kruskal-Wallis for continuous variables and Fisher's exact test for categorical variables were used whenever necessary.

Pearson correlations were used to investigate the relation between the main outcome (QPCQ), other items of the self-administered questionnaire, and maternal and neonatal outcomes.

Bivariate and multivariate analyses enabled the identification of factors associated with the outcome. All variables with a *P*-value < 0.2 in the bivariate analysis were entered into the multivariate analysis. The threshold of significance was set at 0.05.

All statistical analyses were performed with SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

Ethics

This study was approved by the CPP (Committee for the protection of persons participating in biomedical research) Sud Méditerranée on April 15, 2020 (IDRCB 2020-A01023-36). The French national commission for information and liberty (CNIL) authorized the data collection on April 22, 2020 (LsV2765809S), and the protocol was registered on ClinicalTrial.gov on April 30, 2020, under number NCT04368832.

All participants provided informed consent.

Results

Study population

Between April 25, 2020, and June 23, 2020, 55 women agreed to participate in the experimental group and 53 in the control group. Six participants withdrew from the study (changed their mind or were excluded), and six more were then lost to follow-up (did not return the survey). The flow chart (Fig. 1) tracks the contribution of participants within the study. A total of 45 and 39 complete surveys were returned in the experimental and control groups, respectively, for a total of 84.

Demographics and other maternal characteristics

Midwives provided the prenatal care for 81.5% of participants and obstetricians for 18.5%. Demographic characteristics did not appear to differ between the two groups (Table 1). Similarly, no differences were found between the groups for the EPICES social deprivation score, the women's levels of health & eHealth literacy, or for any connection with other outcomes (Table 2).

Main outcome

The mean QPCQ score was 4.15 ± 0.52 in the experimental and 4.27 ± 0.62 in the control groups, (total mean 4.20 ± 0.57 [range:

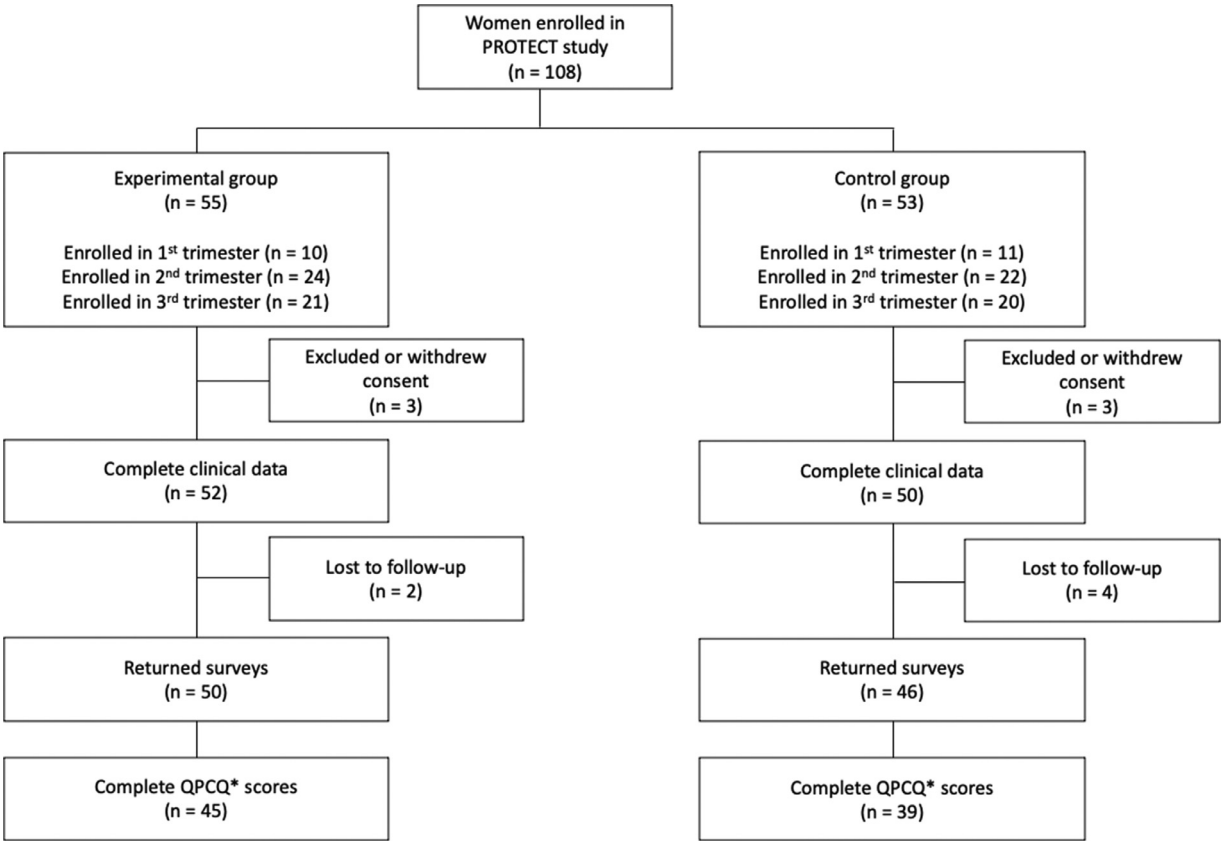

Fig. 1. PROTECT Study flow chart
*QPCQ Quality of Prenatal Care Questionnaire.

Table 1
Sociodemographic characteristics of PROTECT study participants.

	Total N= 102		**Experimental N=52**		**Control N=50**		
	N (%)	mean ± SD*	N (%)	mean ± SD*	N (%)	mean ± SD*	p**
Maternal age (years)	102	29.4 ± 5.1	52	29.4 ± 5.0	50	29.4 ± 5.2	0.99
Marital status							0.22
Married	30 (32.3)		19 (40.4)		11 (23.9)		
Common-law/living with partner	56 (60.2)		24 (51.1)		32 (69.6)		
Single	7 (7.5)		4 (8.5)		3 (6.5)		
Household income per month							0.93
< 610€	4 (4.3)		2 (4.3)		2 (4.3)		
610-1220€	9 (9.8)		6 (13.0)		3 (6.5)		
1220-1830€	12 (13.0)		5 (10.9)		7 (15.2)		
1830-2440€	11 (12.0)		5 (10.9)		6 (13.0)		
2440-2745€	11 (12.0)		6 (13.0)		5 (10.9)		
> 2745€	45 (48.9)		22 (47.8)		23 (50.0)		
Highest level of education							0.36
Primary school	6 (6.7)		3 (6.5)		3 (6.8)		
High school	16 (17.8)		11 (23.9)		5 (11.4)		
University	68 (75.6)		32 (69.6)		36 (81.8)		
BMI (kg/m^2)	102	29.0 ± 5.0	52	29.4 ± 5.2	50	28.6 ± 4.7	0.39
Composite unfavorable outcomes							0.24
No	47 (46.1)		21 (40.4)		26 (52.0)		
Yes	55 (53.9)		31 (59.6)		24 (48.0)		
Antepartum complication composite outcomes							0.50
No	83 (81.4)		41 (78.8)		42 (84.0)		
Yes	19 (18.6)		11 (21.2)		8 (16.0)		
Parity							0.56
Primipara	80 (78.4)		42 (80.8)		38 (76.0)		
Multipara	22 (21.6)		10 (19.2)		12 (24.0)		
Location of the consultation							0.24
Hospital	61 (59.8)		34 (65.4)		27 (54.0)		
In city	41 (40.2)		18 (34.6)		23 (46.0)		
Obstetric consultations (during lockdown)	**99**	**1.7 ± 0.6**	**52**	**1.9 ± 0.6**	**47**	**1.6 ± 0.5**	**0.006**
Obstetric consultations (total)	102	7.5 ± 1.2	52	7.7 ± 1.2	50	7.3 ± 1.3	0.11
Consultation postponement							**0.04**
Participants	**5 (19.2)**		**1 (7.7)**		**4 (30.8)**		
Caregivers	**18 (69.2)**		**12 (92.3)**		**6 (46.2)**		
Participants + Caregivers	**3 (11.5)**		**0 (0.0)**		**3 (23.1)**		
No	76		39		37		
Ask for an additional consultation							0.67
Participants	3 (16.7)		1 (10.0)		2 (25.0)		
Caregivers	11 (61.1)		6 (60.0)		5 (62.5)		
Participants + Caregivers	4 (22.2)		3 (30.0)		1 (12.5)		
No	84		42		42		
Ultrasound (total)	102	4.1 ± 1.0	52	4.2 ± 1.0	50	4.1 ± 0.9	0.70
Conventional hospitalisation							**0.03**
No	**91 (89.2)**		**50 (96.2)**		**41 (82.0)**		
Yes	**11 (10.8)**		**2 (3.8)**		**9 (18.0)**		
Daycare							**0.04**
No	**81 (79.4)**		**37 (71.2)**		**44 (88.0)**		
Yes	**21 (20.6)**		**15 (28.8)**		**6 (12.0)**		
Gestational age at delivery (weeks)	102	39.7 ± 1.3	52	39.8 ± 1.2	50	39.5 ± 1.3	0.15
Onset of labour							0.50
Spontaneous	65 (63.7)		31 (59.6)		34 (68.0)		
Labour induction	34 (33.3)		20 (38.5)		14 (28.0)		
Planned C-section	3 (2.9)		1 (1.9)		2 (4.0)		
Infant birth weight (grams)	100	3345.4 ± 400.6	51	3370.8 ± 362.4	49	3319.0 ± 439.2	0.52
Delivery mode							0.64
Vaginal spontaneous	77 (75.5)		39 (75.0)		38 (76.0)		
Vaginal operative	13 (12.7)		8 (15.4)		5 (10.0)		
C-section	12 (11.8)		5 (9.6)		7 (14.0)		

* Standard deviation.
** Chi-square test or Fisher's exact test for qualitative variables, Student's t-test for quantitative variables. Boldface indicates significance.

2.07–5.0]). These results did not indicate that the mothers' experience of prenatal care differed between the groups (Table 3).

Clinical outcomes

Participants gave birth at a mean of 39 ± 1.3 weeks of gestation, and the newborns' mean weight was 3345 g ± 401 g. Labor was induced in 33.3% and cesarean births occurred in 11.8%. The overall prenatal and postpartum outcomes were similar in the two groups.

Before the lockdown, prenatal care over 8week normally included nearly two visits (monthly monitoring over an 8-week period). This frequency was lower in the control than in the experimental group (1.6 ± 0.5 and 1.9 ± 0.6, P = 0.006) (Table 2). Similarly, postponed appointments differed between the groups (P = 0.04) (Table 2), with patient-cancelled appointments (postponements) higher in the control group (7 cancellations among controls versus 1 in the experimental group), while health professionals cancelled more appointments in the experimental group (6 cancellations in the

Table 2
PROTECT participants' stress and deprivation scores and health literacy, overall and by study group.

	Total N= 96			Experimental N=50 (52.1%)			Control N=46 (47.9%)			
	N	mean	SD*	N	mean	SD*	N	mean	SD*	*P***
PSS[1] Score	93	34.4	17.0	49	36.1	17.5	44	32.6	16.4	0.32
HLQ[2]										
Feel understood and supported by healthcare providers	95	76.4	15.9	49	75.0	16.6	46	77.9	15.1	0.38
Have sufficient information to manage my health	93	70.2	17.3	49	69.7	16.9	44	70.6	17.8	0.80
Actively manage my health	94	73.8	13.7	49	72.8	14.3	45	75.0	13.2	0.45
Able to actively engage with health care providers	95	70.5	16.1	49	69.0	17.2	46	72.0	14.9	0.36
Navigate the health care system	93	82.2	12.2	47	81.6	13.0	46	82.9	11.6	0.60
Social support for health	94	70.8	15.7	49	71.0	15.6	45	70.6	16.0	0.91
Appraisal for health information	95	70.3	13.0	50	70.6	13.7	45	70.0	12.4	0.82
Able to find good health information	95	73.5	14.6	50	74.6	14.1	45	72.3	15.3	0.45
Understand health information well enough to know what to do	93	76.5	13.6	49	75.8	12.8	44	77.3	14.6	0.61
eHLQ[3]										
Use technology to process health information	95	63.8	18.0	50	62.8	18.9	45	64.9	17.0	0.57
Understand health concept and language	92	65.6	16.0	47	65.8	16.8	45	65.3	15.3	0.89
Ablz to actively engage with digital services	92	72.8	15.6	48	72.6	14.5	44	73.0	16.8	0.90
Feel safe and in control	95	59.7	21.2	50	60.1	19.0	45	59.3	23.7	0.84
Motivated to engage with digital services	91	56.0	17.6	47	56.3	17.4	44	55.8	18.1	0.88
Access to digital services that work	90	62.5	14.7	46	63.8	14.3	44	61.2	15.2	0.42
Digital services that suit individual needs	94	64.8	16.0	49	64.8	15.1	45	64.8	17.1	0.99
EPICES Score	84	20.9	16.5	48	22.2	17.5	36	19.1	15.2	0.40

* Standard deviation
** Chi-square test or Fisher's exact test for qualitative variables, Student's t-test for quantitative variables.

[1] Perceived Stress Scale.
[2] Health Literacy Questionnaire.
[3] eHealth Literacy Questionnaire.

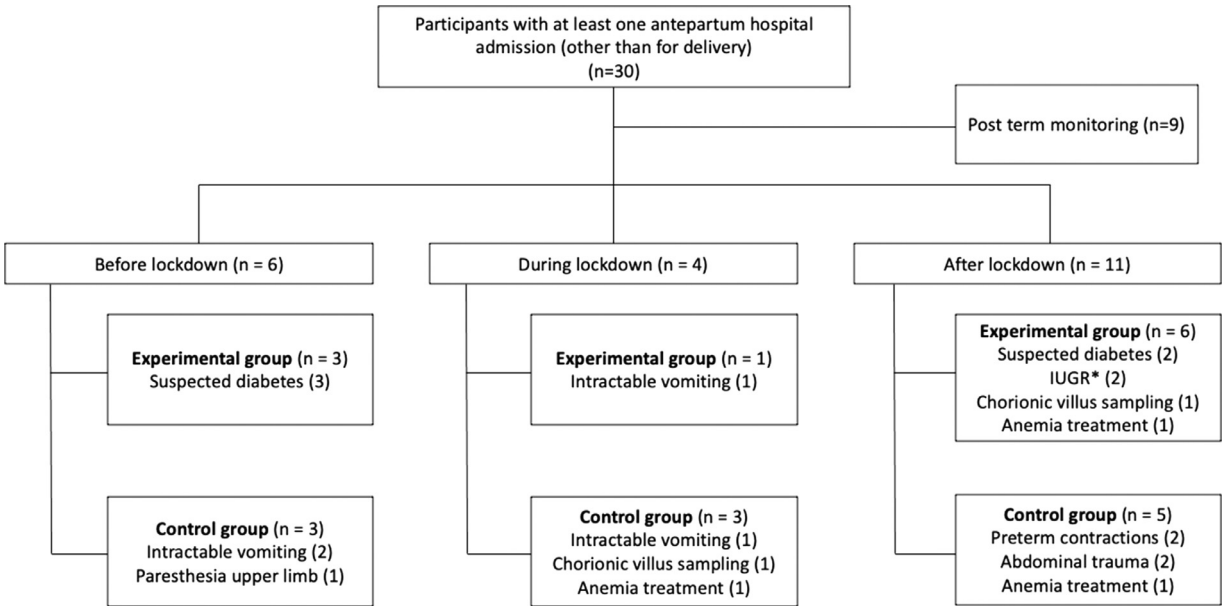

Fig. 2. Hospital stays initial reason for referral within PROTECT participants (day hospitalizations & conventional stays)
*FGR Fetal growth restriction.

control versus 12 in the experimental group). The number of both additional patient-requested and health professional-requested appointments did not differ between the groups. Preferences for future obstetric care were similar; 30% of controls and 32% of women in the intervention group supported the implementation of telehealth visits for a future pregnancy after the end of the health emergency.

Excluding post-term monitoring (n=9), 21 women were admitted for either day hospitalization or conventional stays (n=10 in the control and n=11 in the experimental group). Careful analysis of the initial reasons for hospitalization did not identify any admission due to incidental findings during an in-person consultation. A major somatic complaint (intractable vomiting or preterm contractions), abdominal trauma, a positive screening/diagnostic test (anemia, diabetes, fetal growth restriction), fetal sampling, were the most common reasons for admission (Fig. 2).

Comparing the proportion of day hospitalizations to conventional stays between the two groups highlighted differences in their distribution. Conventional stays predominated in the control group (n=9 versus n=2 in the experimental group, $P = 0.03$), and day hospitalizations in the experimental group (n=15 versus n=6 in the control group, $P = 0.04$).

Discussion

Principal findings

The data provided by the pilot PROTECT study constitute an unprecedented and original source of information on telehealth use for prenatal care of women at low risk. The results support the contention that occasional telehealth use in the pandemic period did not impair women's experience of the quality of their prenatal care.

In our cohort, women's perception of their prenatal care by telehealth was not affected by their levels of health literacy, eHealth literacy, or deprivation. This finding confirms that telehealth can be appropriate for most pregnant women without comorbidity.

Moreover, follow-up through delivery showed no difference between telehealth and in-person consultation for maternal and neonatal outcomes and no hospital admissions due to incidental findings during an in-person consultation. These findings are evidence that the absence of physical examinations for PROTECT participants did not compromise maternal and fetal safety by preventing discovery of a potential complication.

Table 3
QPCQ[1] scores details in PROTECT study.

	Total N= 84			Experimental N=45 (52.1%)			Control N=39 (47.9%)			
	N	mean	SD*	N	mean	SD[2]	N	mean	SD[2]	*P*[3]
Information Sharing	96	4.34	0.58	50	4.31	0.55	46	4.38	0.60	0.5649
Anticipatory Guidance	91	3.68	0.86	48	3.55	0.86	43	3.83	0.85	0.1240
Sufficient Time	93	4.32	0.67	49	4.31	0.56	44	4.33	0.78	0.8545
Approachability	96	4.59	0.65	50	4.63	0.51	46	4.56	0.77	0.6238
Availability	95	3.79	0.98	50	3.67	0.93	45	3.93	1.02	0.1871
Support and Respect	92	4.46	0.63	47	4.45	0.52	45	4.47	0.73	0.8575
Total QPCQ	86	4.20	0.57	45	4.15	0.52	41	4.27	0.62	0.3375

[1] Quality of Prenatal Care Questionnaire.
[2] Standard deviation.
[3] Student's t-test for quantitative variables.

Strengths and limitations

First, the PROTECT study is, as far as we know, the only French study to focus on prenatal care and how women experienced it during the COVID-19 pandemic in a low-risk population. The study's primary interest lies in its collection of pathbreaking data regarding telehealth use. These data can be used in the future to inform recommendations in any new epidemic episode as well as to answer questions about telehealth use in obstetrics in non-epidemic periods.

Second, the exploratory analysis of participants' social and demographic background, and their levels of health literacy, digital health literacy, and deprivation provides new information about connections between women's profiles and their prenatal care experience. The absence of any significant differences between the groups in these profiles strongly suggests that the choice of in-person or telehealth consultations was not based upon participants' social or health literacy levels. Furthermore, these criteria do not appear to have significantly impacted on the quality of prenatal care as assessed by the women in our cohort.

Third, the PROTECT study enabled the collection of an extensive set of maternal and neonatal outcomes that show no evidence of risk modification in either group. This finding is unsurprising given that the participants were at low risk. Nevertheless, the absence of hospital admissions due to incidental findings during any face-to-face consultations offers additional reassurance about the safety of telehealth in a low-risk population.

The study also has limitations that must be considered. The size of the study population was initially defined to identify potential differences between telehealth and in-person care. This population sample was not intended to establish the non-inferiority of one of these modes of prenatal care nor was it appropriate for that purpose. Due to the fast-moving health situation and the removal of the first lockdown, it was impossible to confirm the non-inferiority of telehealth monitoring by enrolling more participants. This point is an inherent limitation to the internal validity of the results about the potential benefits of telehealth. However, the PROTECT study remains useful, above and beyond the data it collected, as a pilot study to optimize the design and implementation of further studies exploring telehealth use in obstetrics or primary care.

Clinical implications

Previously published studies exploring QPCQ report mean scores ranging from 4.11 in an Australian population to 4.41 in a Canadian population of native French speakers. The mean QPCQ score for PROTECT participants was similar to those observed in the Australian and Canadian people in non-pandemic periods. The distribution within subscales was also identical, with low scores for anticipatory guidance than other subscales in the PROTECT, French-speaking Canadian, and Australian populations. In both PROTECT groups, the highest subscale score was for approachability, consistent with the observation among the French Canadian women. These outcomes indicate that women within populations whose health care meets high standards experience their prenatal care homogeneously regardless of whether a pandemic is raging.

Interpretation of results

Further support for the acceptability of telehealth in prenatal care during pandemic episodes comes from North American data. A study published in 2020 reported thatpatients and health professionals within the New York's largest healthcare provider expressed a high satisfaction with telehealth visits. The participants desired to integrate this model of care into the traditional model of high-risk obstetric care and73.8% of patients favored a combination of in-person and telehealth visits during their pregnancy [24]. A survey during the same period of the United Kingdom lockdown highlighted the benefits of social media use in providing medical support to pregnant women [25]. Responses of PROTECT participants did not indicate as much patient interest in telehealth implementation; of the patients with telehealth visits, 32% favored their implementation in a non-pandemic period. This result does not appear consistent with the global positive assessment of the telehealth experience in the PROTECT study and could be related to some confounding variables, including overexposure to digital media during the pandemic.

The North American study suggested that implementing a telehealth model in high-risk obstetrics could improve access to obstetric care for women at high risk by reducing their rate of missed appointments(24). This point is equally clear in the PROTECT outcomes: visit frequency in the experimental group was close to that expected — 1.9 consultations for 8 weeks. In contrast, the consultation frequency was lower than expected in the control group — 1.6 consultations for 8 weeks, due primarily to patient cancellations.

Research implications

The design of the PROTECT study did not plan to assess the effect of professionals' preferences on the choice of telehealth or in-person care. Nonetheless, informal interactions between researchers and participants during the initial enrollment and telephone reminders revealed that providers' attitudes significantly affected this choice. Similarly, the intergroup difference between day hospitalization and conventional overnight stays for prenatal admissions suggests different obstetric management processes by the professionals. Our data collection did not allow us to assess if providers attitude — uptake or opposition — toward telehealth affected how women experienced their prenatal care. Further assessments are essential because professionals' use of telehealth may explain a large part of women's perceptions of their prenatal care.

Conclusion

The PROTECT pilot study confirms the feasibility of telehealth implementation for pregnant women at low risk prenatal care during pandemic periods, regardless of demographic factors or levels of deprivation or health or digital health literacy. These results support the conclusion that occasional telehealth use during the pandemic period does not impair women's experience of the quality of their prenatal care. Both telehealth and in-person visits that include sanitary restrictions appear to ensure prenatal care meets high health standards. These findings provide reassurance about prenatal care in pandemic situations and should encourage health authorities to pursue experimentation and research in telehealth application to conventional obstetric care.

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