BMJ Open

How midwives implemented teleconsultations during the COVID-19 health crisis: a mixed-methods study

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To cite: Rousseau A, Gaucher L, Gautier S, *et al*. How midwives implemented teleconsultations during the COVID-19 health crisis: a mixed-methods study. *BMJ Open* 2022;**12**:e057292. doi:10.1136/bmjopen-2021-057292

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2021-057292).

Received 14 September 2021
Accepted 11 March 2022

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ABSTRACT

Objectives Our primary and secondary objectives were to measure and understand the determinants of independent midwives' implementation of teleconsultations and their intention to continue these in the future.

Design A two-phase mixed-methods approach: (1) quantitative data to measure factors determining the initiation and continuation of teleconsultation, collected by an online survey from 29 April to 15 May 2020, at the end of the first COVID-19 lockdown, followed by (2) qualitative data to understand these determinants, by interviewing some participants in May–July 2020 to explore the quantitative findings in more detail.

Setting Mainland France

Participants The target population comprised independent midwives currently practising in France.

Primary and secondary outcome measures The primary and secondary outcomes were binary variables: implementation of teleconsultations, and intention to continue them. The qualitative results provided the themes explaining these decisions.

Results We obtained 1491 complete responses from independent midwives, that is, 28.3% of French independent midwives, and interviewed 22 volunteers among them. Among the 1491, 88.5% implemented teleconsultations and 65.8% intended to continue them. Both individual and organisational factors favoured implementation of teleconsultations: older age (adjusted OR (aOR): 0.40, 95% CI: 0.28 to 0.58), female gender (aOR: 6.88, 95% CI: 2.71 to 17.48), married or living with a partner (aOR: 1.67, 95% CI: 1.10 to 2.52) and working in a group practice (midwives only—aOR: 2.34, 95% CI: 1.47 to 3.72; multiprofessional group—aOR: 1.75, 95% CI: 1.16 to 2.64). The qualitative analysis did not identify any new factors but helped us to understand the satisfaction better: midwives adopted telemedicine for their patients' access to and continuity of care, to maintain their professional activity and income, and to limit the risks of infection.

Conclusion Personal and organisational factors motivated the implementation of teleconsultation during the pandemic, but maintaining it raises technical, regulatory, and ethical issues.

Strengths and limitations of this study

- Our sample included 28.3% of French independent midwives, with homogeneous geographical coverage.
- The mixed-method analysis used, including both qualitative and quantitative data, enabled us to explore in detail individual and organisational factors associated with implementation of teleconsultations.
- Our sample presented a response bias linked to the survey's dissemination and snowball effect. This selection bias may also have led to the over-representation of midwives performing teleconsultations.
- Our self-reported survey and the qualitative interviews may introduce a social desirability bias. Nonetheless, the qualitative analysis reinforced the quantitative results.

INTRODUCTION

The first cases of COVID-19 were identified in France on 29 January 2020.[1] The rapid increase of the epidemic led to the implementation of a lockdown from 17 March to 11 May. At that time, literature on the risks of the epidemic for pregnant women and newborns was extremely sparse.[2 3] In this context of isolation, lack of knowledge, and guidelines that changed daily, midwives modified their practices to limit the risk of infection to their patients and themselves while ensuring continuity of care. We thus observed cancellation or postponement by independent midwives of such perinatal consultations as childbirth preparation, non-emergency preventive gynaecology consultations, early prenatal interviews and postnatal follow-up.[4] In this situation, it became clear that teleconsultations could play an important role in this health crisis by limiting in-person, face-to-face visits while improving the follow-up of women and maintaining their relationship with their midwives.[5 6]

The terms and definitions used in telemedicine and telehealth may differ slightly. Telemedicine refers to medical practitioners using telecommunications tools for remote diagnosis and medical care, including patient education.[7] Some authors point out that the

terms telehealth and telemedicine have often been used interchangeably.[8 9] Nevertheless, telehealth covers the broader field of public health and health administration, while telemedicine, the original term, is defined as the practice of healthcare delivery.[10] Telemedicine includes teleconsultations, tele-expertise, telemonitoring and even answering questions.[11 12] During the crisis situation in France, even simple phone calls could be charged as teleconsultations, without any video transmission. We will therefore use the term 'teleconsultation' to refer to medical consultations or support provided by midwives using telecommunications technology.

The literature has shown that teleconsultation can be an alternative to face-to-face visits, especially for follow-up of patients with chronic diseases, and can produce high patient and staff satisfaction and no difference in disease outcome.[13–17] Nonetheless, such consultations are limited in terms of ability to provide clinical assessment and confidentiality (ie, neither women nor midwives can see who else is hearing the conversation).[18 19] At the beginning of this health crisis, although no French professional society had proposed guidelines for the use of teleconsultation in obstetrics, it appeared this treatment format could play an important role in the care of pregnant women and in prevention.[6 17] The forms its use could take were thus left free to each user.

In France, women can have their pregnancy monitored by a midwife, a general practitioner or an obstetrician, at the hospital or by independent professional. The French social security system with its direct payment system (the provider is paid by the health insurance and not by the patient) and the ban on midwives charging more than the officially fixed rates for their care makes them accessible to all women; payment is on a fee-for-service basis. Midwives' practices are governed by statutes and regulations that state that they can only handle physiological pregnancies.[20 21] Women with such a pregnancy can therefore choose the professional who will monitor their pregnancy, through information available on the internet, and their costs will be covered by the health insurance. In 2016, midwives monitored 23.3% of pregnancies in France, hospital midwives 14.8% and independent midwives, most of whom have a private practice, 8.5%. The most recent data suggest a trend towards an increasing proportion of pregnancies monitored by midwives.[22] Midwives can practice in hospitals, in maternal and child welfare agencies or in independent practice. Their skills allow independent midwives to provide physiological monitoring of pregnancy, preparation for childbirth and postnatal monitoring, as well as preventive gynaecological monitoring and perineal rehabilitation. Midwives are allowed to assist in home births in France, but these are quite rare (less than 1% of births). The independent midwives can carry out their follow-up at the women's home or at their office. Before 20 March 2020, they were not allowed to practise teleconsultations, although physicians could do so. The regulatory text authorised all French midwives, whether they worked independently or in hospitals, to perform teleconsultations during the pandemic period, from their office or the hospital in which they practice. These teleconsultation acts are paid at the same price as simple office consultations. According to the national health insurance fund (*Caisse nationale d'assurance maladie*), teleconsultations accounted for 14%–22% of all midwives' consultations during lockdown (unpublished data). Thus, it seemed useful to assess their appropriation of this new tool in the context of COVID-19.

Our primary objective was to measure and understand the determinants of the implementation of teleconsultations. Our secondary objective was to measure and understand the determinants of the intention to continue teleconsultations in the future, after the crisis has passed.

MATERIAL AND METHODS

We used a two-phase mixed-methods approach[23]: (1) a quantitative phase aimed at measuring the factors determining the implementation of teleconsultations and the intention to continue them used an online questionnaire survey of independent midwives, conducted from 29 April to 15 May 2020, at the end of the first COVID-19 lockdown; followed by (2) a qualitative phase to understand the impact of both sets of determinants, by interviewing independent midwives from May to July 2020.

Screening and recruitment

Participants included in the survey were French independent (ie, community) midwives. Specifically, independent midwives currently practicing in France (n=5264 in 2020 according to National Chamber of the French Midwifery Council) comprised the target population for the quantitative survey. The link to the survey was distributed by email and the websites and social networks (Twitter) of professional associations: the French national college of midwives (*Collège National des Sages-Femmes de France*), the French union of midwives (*Organisation nationale syndicale des sages-femmes*), the French association of independent Midwives (*Association Nationale des Sages-Femmes Libérales*) and the French association of coordinating midwives (*Association Nationale des Sages-Femmes Coordinatrices*). Participants received an initial email followed by one gentle reminder, 2 weeks later. We also employed the snowball effect to disseminate the questionnaire as widely as possible by asking participants to forward the link to others.

At the end of the questionnaire, midwives were invited to leave their email address if they were willing to be contacted again for interviews. Some of these volunteers were then randomly selected to participate in the qualitative phase and contacted by email for a video conference interview.

Survey instrument

The questionnaire for the quantitative phase

The self-administered questionnaire, structured in two parts, included both single-answer and multiple-choice questions (online supplemental appendix 1):

- Five questions on midwives' individual characteristics and practice settings: age, professional experience, gender (male, female), family situation (single, divorced or widowed vs married, or living with a partner), practice setting (alone, with a group of other midwives or in a group of two or more types of health professionals), geographical/administrative district of practice.
- Eight questions about teleconsultation activity: implementation of teleconsultations (yes/no), types of consultations conducted by teleconsultation, tool used, proportion of the activity conducted by this method, satisfaction, ease of use, the implementation of teleconsultations (at the midwife's initiative, at the woman's request, for all women, for women who tested positive for COVID-19 19, for symptomatic women), motivation for adoption (or not), desire to continue some visits by teleconsultation in the future (yes/no).

The questionnaire was developed by the coauthors and reviewed and tested by 10 midwives to verify the comprehensibility of the questions, the formatting of the questionnaire and the functioning of the platform. The questionnaire was available via the secure *LimeSurvey* software platform. Two introductory questions verified that the participant was a practising independent midwife and had not previously participated in the survey; if either was not the case, a thank you message ended their participation and closed the survey. To limit the risk of multiple participation, only one entry from any IP address was allowed. All items were mandatory, not randomly order, and respondents were not able to review or change their answers.[24]

The interview guide for the qualitative phase

The interviews were all conducted by the same researcher, a PhD midwife in qualitative research (SB), who used an interview guide.

This guide was structured in four parts: (1) the concrete implementation of teleconsultations and their appropriation by the midwives (time spent, tools used, activities concerned, practical organisation); (2) the midwives' motivations; (3) the advantages and disadvantages of teleconsultation according to the midwives; and (4) the midwives' satisfaction and their desire to continue remote consultations or not. Some demographic data were also collected to characterise the study population: age, gender, number of years since completing midwifery training and practice setting. The interviews lasted an average of 40 min. Three interviews served as the test phase; because they did not lead to any major modification of the tool, they were included in the study.

Patient and public involvement statement

Not appropriate

Analysis

Quantitative analysis

In view of the population surveyed (5264 independent midwives practicing in France) and an ideal random sampling strategy, the minimum sample size was 887 respondents with a margin of error of 3% and a level of confidence in the responses of 95% without any assumption on the estimated proportions.

Categorical variables were described with numbers and percentages, and their proportions compared with the χ^2 or Fisher's exact test, as appropriate. Quantitative variables were described by their means and SD, or by their medians and IQR, as appropriate.

For our primary quantitative outcome, our dependent variable was the midwife's implementation of teleconsultations. Continuation of these remote visits was the dependent variable for the secondary quantitative outcome. For both these quantitative objectives, our independent variables were the individual and organisational factors (also called determinants). Potential determinants were individual and organisational factors as categorical variables: age (binary variable by the median), gender, family situation, and practice setting.

All independent variables with $p<0.20$ in univariate analysis were included in the multivariate model. ORs and their 95% CIs were estimated.

According to the data provided by National Chamber of the French Midwifery Council (*Conseil National de l'Ordre des Sages-Femmes*), our sample did not differ significantly from the general population of independent midwives for gender (female 98.1% vs 97.3%, p=0.08), but was statistically significantly different for age (median 41 vs 39, $p<0.001$). We therefore chose to weight the analysis for age a posteriori to take this selection bias into account. The weight applied to each respondent was calculated by taking into account the age group (20–30, 31–40, 41–50, >50 years) to which the respondent belonged and the proportion of this same age group represented in the sample population (online supplemental appendix 2: weighting calculation).

All statistical tests were two-sided, and $p<0.05$ was considered statistically significant. Statistical analysis was conducted with *R* 4.1.0.

Qualitative analysis

After all interviews were completely transcribed, we conducted an inductive content analysis using a grounded theory approach[25] to obtain theories from empirical material. Content analysis involved breaking down the corpus and then coding it. This process transforms the raw data, classifying it into units that allow a precise description of the content's relevant characteristics. The codes were developed from the transcripts and then grouped into categories and subcategories. Two researchers (SB and IM) performed this analysis independently and then compared their results, looking for recurrences in the views expressed to identify the strongest groups of ideas as well as for specificities of and exceptions to the discourse.

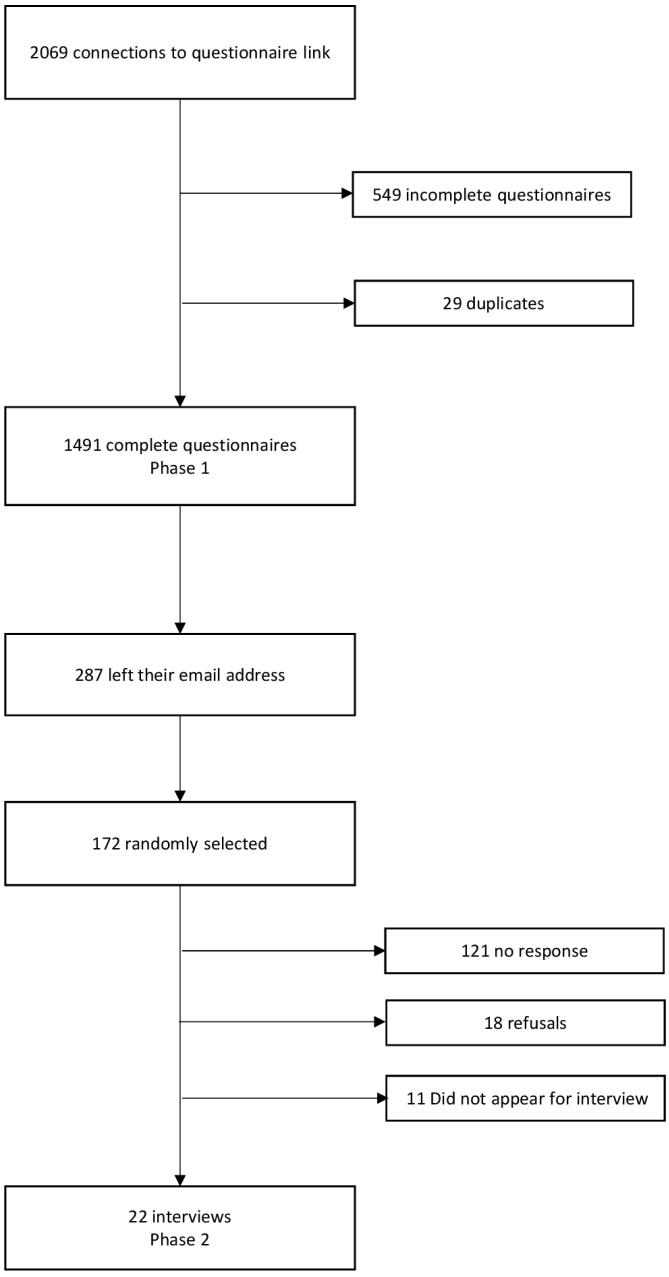

Figure 1 Flow chart.

RESULTS

We obtained 1491 complete responses from independent midwives, that is, 28.3% of French independent midwives, who represented all the administrative/geographical districts in mainland France. We interviewed 22 volunteers among them (figure 1: Fflow chart).

The results of the qualitative phase will be described after each category of quantitative results to complete or explain them, for each of the following three result areas.

Description of midwives' characteristics

Table 1 summarises the characteristics of the midwives participating in phase 1 and phase 2. The phase 1 sample comprised mainly women (98.1%), most of whom were married or living with a partner (82.7%).

Table 1 Midwives' characteristics of quantitative and qualitative phases

		Quantitative phase	Qualitative phase
		n = 1491	n = 22
Age, years	Mean±SD	42.1±10.2	42.9±7.4
	Median	41	42.5
Age, years, n (%)	≤41 years	751 (50.4)	10 (45.5)
	>41 years	740 (49.6)	12 (54.5)
Gender, n (%)	Female	1463 (98.1)	22 (100.0)
	Male	28 (1.9)	0 (0.0)
Family situation, n (%)	Single, divorced, widowed	258 (17.3)	8 (36.4)
	Married, living with partner	1233 (82.7)	14 (63.6)
Experience, years	Mean±SD	18.4±10.5	18.9±7.6
	Median	18	17.5
Practice setting	Solo	575 (38.6)	2 (9.1)
	With other midwives only	386 (25.9)	6 (27.3)
	With ≥2 types of medical professionals	530 (35.5)	14 (63.6)

Measurement of factors determining the implementation of teleconsultations and intention to continue them: quantitative and qualitative results

The quantitative results describe teleconsultation practices and measure their determinants, while the qualitative results describe practice and explain determinants.

Teleconsultation modalities

In total, among the 1491 midwives who answered the questionnaire, 1319 (88.5%) midwives performed teleconsultations during the first lockdown, for the following activities (in decreasing order of frequency): individual birth preparation (n=1138, 86.3%), early prenatal interviews (n=1136, 86.1%), contraception prescription (n=879, 66.6%), fourth and seventh month pregnancy consultations (n=746, 56.6%), support of women with psychological fragility (n=646, 49.0%), group childbirth preparation (n=555, 42.1%), preventive gynaecology consultations (n=422, 32.0%), postnatal visits (n=418, 31.7%) and postnatal follow-up (n=284, 21.5%). Overall, 172 (11.5%) midwives performed no teleconsultations, 629 (42.2%) performed less than 25% of their consultations remotely, 477 (32.0%) around 50%, and 213 (14.3%) more than 75%. Teleconsultation was conducted by telephone (n=676, 51.2%), by videoconference with a specific secure professional tool (n=813, 61.6%) or by videoconference without such a tool (n=824, 62.5%). Most midwives had suggested teleconsultations themselves; only 19.7% (n=293) had implemented teleconsultation

at the request of women under their care. Only 32.6% (n=486) of the midwives held teleconsultation with all of their patients.

Among the 22 midwives interviewed, all had implemented teleconsultations and considered implementation 'very easy'. The majority (17/22) offered teleconsultations to women as soon as they were authorised on 20 March 2020. They described an initial hesitation about tool use and then got organised: 14 used dedicated software (Doctolib, Prédis, Covaliaweb, etc) for consultations. Among them, four very quickly abandoned this dedicated tool because of technical problems or lack of functionality ('…management too complex, too time-consuming'). All the midwives in our study reported using non-dedicated tools (Skype, WhatsApp, Facetime, Zoom, Messenger or simply the telephone): 10 used these tools in addition to dedicated software (especially for childbirth preparation) and 12 used these non-dedicated tools exclusively. They described them as very practical and emphasised that 'today, all women have a smartphone, it is very easy to use and women are very comfortable with it'. The activities cited as concerned by teleconsultation in midwives' practice were individual or collective childbirth preparation (19/22), early prenatal interviews (10/22), follow-up gynaecological consultations (9/22), before and after voluntary abortion consultations (6/22), postpartum follow-up and more specifically breastfeeding support (6/22) and prenatal consultations (4/22).

Determinants of the implementation of teleconsultation

Table 2 describes associations of individual and organisational factors with the implementation of teleconsultations. Younger midwives, those married or living with a partner and those working in group settings were significantly more likely to implement teleconsultations. These results were confirmed in the multivariate weighted analysis.

Determinant of intention to continue teleconsultations

Table 3 describes the associations of individual and organisational factors with and the intention to continue to use this consultation tool in the future. There were also significant associations with age and family situation in the weighted crude analysis and with family situation only in the multivariate weighted analysis.

Understanding the effects of factors determining the implementation of teleconsultations and intention to continue them: quantitative and qualitative results

Reasons for performing (or not) teleconsultations

Quantitative results showed that, among midwives performing teleconsultations (n=1319), more than three quarters (n=1029, 78%) found implementation easy, 1131 (85.7%) were satisfied and 981 (74.4%) thought they would continue this type of activity in the future. Among all the respondents (n=1491), the main motivations for setting up teleconsultation were to continue

Table 2 Determinants of teleconsultation implementation

	Teleconsultation n = 1319 N (row %)	No teleconsultation n = 172 N (row %)	Weighted crude OR	Weighted adjusted OR*
Individual factors				
Age				
≤41 years	692 (92.6†)	59 (7.4†)	**1**	**1**
>41 years	627 (83.6†)	113 (16.4†)	**0.40 (0.28 to 0.58)**	**0.40 (0.27 to 0.57)**
Gender				
Male	19 (66.2†)	9 (33.8†)	**1**	**1**
Female	1300 (89.1†)	163 (10.9†)	**4.19 (1.78 to 9.91)**	**6.88 (2.71 to 17.48)**
Family situation				
Single, divorced, widowed	214 (83.4†)	44 (16.6†)	**1**	**1**
Married, living with partner	1105 (89.9†)	128 (10.1†)	**1.78 (1.18 to 2.66)**	**1.67 (1.10 to 2.52)**
Organisational factors				
Practice setting				
Solo	483 (83.6†)	92 (16.4†)	**1**	**1**
With other midwives only	355 (92.5†)	31 (7.5†)	**2.41 (1.52 to 3.82)**	**2.34 (1.47 to 3.72)**
With ≥2 types of medical professionals	481 (91.1†)	49 (8.9†)	**2.01 (1.34 to 3.02)**	**1.75 (1.16 to 2.64)**

Values in bold correspond to p value <0.05 and are considered statistically significant.
*Multivariate logistic regression (adjusted for age, gender, family situation and practice setting).
†Weighted percentage.

Table 3 Determinants of the continuation of teleconsultation

	Teleconsultation in the future	No teleconsultation in future		
	n = 981	n = 338		
	N (row %)	N (row %)	Weighted crude OR	Weighted adjusted OR*
Individual factors				
Age				
≤41 years	529 (75.5†)	163 (24.5†)	**1**	1
>41 years	452 (70.0†)	175 (30.0†)	**0.76 (0.58 to 0.99)**	0.97 (0.70 to 1.33)
Gender				
Male	16 (80.0†)	3 (20.0†)	1	1
Female	965 (73.2†)	335 (26.8†)	0.68 (0.17 to 2.66)	0.88 [0.17 to 4.60)
Family situation				
Single, divorced, widowed	149 (66.6†)	65 (33.4†)	**1**	**1**
Married, living with partner	832 (74.7†)	273 (25.3†)	**1.48 (1.04 to 2.10)**	**1.60 (1.07 to 2.41)**
Organisational factors				
Practice setting				
Solo	344 (70.8†)	139 (29.2†)	1	1
With other midwives only	269 (75.2†)	86 (24.8†)	1.26 (0.89 to 1.77)	1.20 (0.80 to 1.79)
With ≥2 types of medical professionals	368 (74.2†)	113 (25.8†)	1.19 (0.87 to 1.63)	1.14 (0.78 to 1.65)

Values in bold correspond to p value <0.05 and are considered statistically significant.
*Multivariate logistic regression (adjusted for age, gender, family situation and practice setting).
†Weighted percentage.

the follow-up of current patients (n=1272, 85.3%), to maintain contact with those women with psychological fragility (n=977, 65.5%), to follow guidelines (n=994, 66.7%), to avoid infection of patients (n=961, 64.4%), to maintain their income (n=852, 57.1%) and to avoid personal infection (n=716, 48.0%). The main reasons for not performing teleconsultations (n=172) were that they were not convinced of the tool's utility and appropriateness (n=80, 46.5%), technical reasons (n=68, 39.5%), their patients were not in favour of it (n=37, 21.5%) or the tool they used was unsuitable (n=23, 13.4%).

The qualitative results make it possible to understand what factors influenced the use of teleconsultation and why.

In the interviews, midwives explained that they set up teleconsultations for several reasons: (1) to maintain access and continuity of care ('We couldn't abandon the women', 'We had to continue to ensure access to care'); (2) to limit the risk of infection ('Teleconsultation also helped to limit contact and contamination'); and (3) to maintain their professional activity and their income ('During the confinement, it was very stressful financially speaking…so teleconsultation was a real lifeline for us, the independent midwives!'). Although telehealth was not a legal requirement, both patients and midwives felt constrained to use it, because of the pandemic and in particular because of the lockdown (with nurseries and schools closed, all parents, including patients and health professionals, were required to care for their children at home).

The reasons for not conducting teleconsultations mainly involved technical limitations: (1) the impossibility of clinical examinations was of particular concern ('The clinical examination is impossible: no palpation, no blood pressure, you can't touch…the essential thing!'; 'The danger is missing something'); (2) the unsuitability of teleconsultations for certain practices ('Me, sophrology…without touching, I don't know how to do it…I can't show or make future parents feel things…'); and (3) purely technical problems, in particular, recurrent internet connection problems.

Motivations for continuing this practice and midwives' satisfaction

The quantitative analysis showed that midwives who wanted to continue teleconsultation were satisfied with this tool significantly more often than those who wanted to stop (96.4% vs 54.7%, p<0.001).

In the qualitative analysis, most midwives (18/22) were satisfied with teleconsultation during the pandemic because it allowed them to maintain their relationship with their patients and to continue working. Furthermore, 16 of them wanted to continue, mainly for reasons of personal and professional organisation ('teleconsultations allow me to organise my schedule according to my family constraints…'; 'I could do consultations at home on days when my colleague is in the practice.'.

Other motivations cited included the practicality, ease of use, and patient satisfaction ('It's very simple!'; 'The women are very satisfied with it: no need to pack up the children and make a journey for a simple pill renewal, for example'; 'I was able to do some preparatory sessions with one of my patients who was in hospital. She was delighted!') and finally, according to the midwives, this change in practices followed the digital trends in society ('Our society, our life is connected, it is normal for medicine to become connected too'.) The midwives who did not wish to continue teleconsultations after the end of the confinement put forward the human relationship and the contact essential to the clinical sense ('Our job is a contact job, it's about people. And how can we take care of women and newborns without contact? I can't imagine doing my job through a screen!').

DISCUSSION

Main findings

We found that the determinants of teleconsultation use were individual and organisational factors: younger age, female gender, married or living with a partner, working in a group practice. The qualitative analysis did not identify any new factors but underlined that the new personal and professional organisation made possible by telemedicine explains the desire to continue this form of work.

Clinical meaning

At the beginning of the lockdown (March 2020), we observed that midwives were obliged to postpone or cancel certain activities, including especially childbirth preparation (78.3%), non-emergency gynaecology consultations (64.3%) and early prenatal interviews (11.2%).[4] These are mainly the same activities that we found to be performed remotely most often: childbirth preparation (86.3%), early prenatal interview (86.1%) and contraception prescription (66.6%). The authorisation of teleconsultations by midwives in this health crisis situation played an important role in enabling continuing access to care for women. The national health insurance fund (*Caisse nationale d'assurance maladie*) observed that the number of teleconsultations multiplied by 100 between 2019 and 2020. Telemedicine has thus become an essential new element in the continuity of care provided by midwives. The exceptional authorisation to perform teleconsultation by midwife was made permanent on 20 December 2021 for all midwives across France.

Again, we note that younger professionals are adapting their practices more easily and implementing teleconsultation more often. We were also able to show that the family and professional context influenced this practice. During the lockdown, the entire population was confined, with parents forced to organise their work to allow them to look after their children, for schools were closed. It is therefore easy to understand that midwives with partners or married were more tempted to set up teleconsultations. The technical difficulties raised as a major obstacle were probably more easily solved in group practices. Our mixed analysis identified the same barriers and disadvantages of teleconsultation as earlier literature, both quantitative and qualitative: technical barriers and difficulties in performing the traditional clinical examination of patients.[16 19 26] The study was conducted for only 1 month after midwives were authorised to perform teleconsultations, which may not have allowed them enough time to appropriate the tool.

We observed that most midwives interviewed were satisfied with teleconsultations. The pre-COVID literature showed that patient satisfaction is higher than that of professionals.[13 27 28] The health conditions and the motivations to carry out teleconsultations may explain midwives' satisfaction in this context. The qualitative analysis showed that midwives were very satisfied on a personal level with this opportunity to practice during this health crisis, in particular, because they could continue to work and be paid (French independent midwives are paid only on a fee-for-service basis) and because these forms of practice allowed them to take care of their family and children during the lockdown. Nevertheless, many reported that the lack of human contact and the screen are important obstacles to clinical care. The majority of the midwives interviewed consider teleconsultation as an excellent 'complementary tool' ('Teleconsultation fits perfectly into my care and support practice'; 'It is rather a good complementary tool. It can be very practical between two home visits in post partum for example') despite certain limitations related to care and relationships. Teleconsultation also raises questions about medical confidentiality, the relationship of trust, and accessibility for women in precarious situations.

The qualitative analysis made it possible to understand that teleconsultation, such as personal assistance or telephone advice calls, represented an important activity that was not previously recognised and not paid. These 'consultations' can be extremely short and raise the question of their remuneration, nevertheless they can contribute in a major way to the quality of care because they enable prevention, screening, education and advice at the moment women need them. Nevertheless, our results show that midwives adopted teleconsultation to continue to provide their patients with care despite the health crisis. This underlines the extent to which, in crisis situations, healthcare workers play an essential role in change and adaptation.[29] The challenge is then to determine the conditions in which innovations persist over time.[30]

Strength and limitations

Our survey allowed us to question 28.3% of French independent midwives with homogeneous geographical coverage, although we have no information about the type of midwifery patients they saw, for example, whether their practice was rural or urban. The mixed-method analysis used, including both qualitative and quantitative data, enabled us to explore in detail individual and organisational factors associated with the implementation of teleconsultation. The absence of a

new explanatory factor in the qualitative component reinforces the validity of the quantitative data.

Nevertheless, this survey had limitations. First, our sample presented a selection bias linked to survey dissemination. Dissemination by professional associations and the snowball effect did not allow us to have a sample representative of midwives' age. This bias was nevertheless taken into account with the weighted analysis. This selection bias may also have led to an over-representation of midwives performing teleconsultations because they are more 'online' and connected. Second, both self-reported survey and qualitative interviews may be affected by a social desirability bias. Nonetheless, the qualitative analysis reinforced the results of the quantitative analysis.

Perspectives

Further surveys exploring women's satisfaction, psychological follow-up, and quality of care should be conducted to see the impact of the implementation of teleconsultation and to consider its future use. Special attention must be paid to women in precarious and vulnerable situations, who may not be able to use it.

In future practice, functional tools must be developed to facilitate the implementation of teleconsultation and a reflection must be carried out to define the activities concerned outside of health crisis periods. Telemedicine in the perinatal period includes remote patient visits (diagnosis, treatment…) but also follow-up and advice with preparation for childbirth and teleconsultations between and among health professionals). Telephone calls should be valued.

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Acknowledgements We thank the ACCORD network (Assembler, Coordonner, COmprendre, Rechercher, Débattre en soins primaires) for reflection and help in the design of the questionnaire. We thank the French College of Midwives (Collège National des Sages-femmes de France), the French union of midwives (Organisation nationale syndicale des sages-femmes), the National Association of Liberal Midwives (Association Nationale des Sages-Femmes Libérales), the National Association of Coordinating Midwives (Association Nationale des Sages-Femmes Coordinatrices) and the French Federation of Perinatal Health Networks (Fédération Française des Réseaux de Santé en Périnatalité) for the distribution of the survey. We thank the National Chamber of the French Midwifery Council (Conseil National de l'Ordre des Sages-Femmes) for providing the demographic data related to this profession. We thank Jo Ann Cahn for editing our English.

Contributors All authors (AR, LG, IM, SG, SB) participated in the conception, design and interpretation of the results. IM and SB conducted the content analysis. AR, LG and SG conducted statistical analysis. AR wrote the article, and all the other authors critically revised the article. All authors commented on and approved the draft and final manuscript. AR is the guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The questionnaire was anonymous. Participants gave their consent by participating in the study, which they were able to stop at any time to withdraw permission. At the beginning of the questionnaire, were clearly stated: the objectives of the study, the estimated length of time of the survey, where and for how long data were stored, who the investigators were, the registered number of the Ethics Committee, as well as the procedure for submitting objections to such research to the national authorities. This study was approved by the Ethics Committee of the Hospices Civils de Lyon (decision no 20-48 dated 23 March 2020) and registered to the Comission nationale de l'informatique et des libertés (CNIL, MR-004 no 2217640 dated 17 April 2020).

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

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