Telehealth use in maternity care during a pandemic

A lot of bad, some good and possibility

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Telehealth use in maternity care during a pandemic: A lot of bad, some good and possibility

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ABSTRACT

Background: To reduce transmission risk during the COVID-19 pandemic, 'telehealth' (health care delivered via telephone/video-conferencing) was implemented into Australian maternity services. Whilst some reports on telehealth implementation ensued, there was scant evidence on women and midwives' perspectives regarding telehealth use.

Methods: A qualitative study was conducted in Australia during 2020–2021 using two data sources from the Birth in the Time of COVID-19 (BITTOC) study: i) interviews and ii) surveys (open-text responses). Content analysis was utilised to analyse the data and explore telehealth from the perspective of midwives and women accessing maternity care services. In-depth interviews were conducted with 20 women and 16 midwives. Survey responses were provided from 687 midwives and 2525 women who were pregnant or gave birth in 2021, generating 212 and 812 comments respectively.

Findings: Telehealth delivery was variable nationally and undertaken primarily by telephone/videoconferencing. Perceived benefits included: reduced COVID-19 transmission risk, increased flexibility, convenience and cost efficiency. However, women described inadequate assessment, and negative impacts on communication and rapport development. Midwives had similar concerns and also reported technological challenges.

Conclusion: During the COVID-19 pandemic, telehealth offered flexibility, convenience and cost efficiency whilst reducing COVID-19 transmission, yet benefits came at a cost. Telehealth may particularly suit women in rural and remote areas, however, it also has the potential to further reduce equitable, and appropriate care delivery for those at greatest risk of poor outcomes. Telehealth may play an adjunct role in post-pandemic maternity services, but is not a suitable replacement to traditional face-to-face maternity care.

Statement of significance

Problem or issue

The impacts of telehealth on the quality-of-care midwives were able to deliver, and pregnant women received is largely unknown.

What is already known

During the COVID-19 pandemic, telehealth services were widely implemented into Australian maternity services, with the aim of reducing the risk of COVID-19 transmission.

What this paper adds

- Telehealth was identified as providing convenience, cost efficacy and flexibility, particularly in rural/remote areas. Quality

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of care was compromised when it came to properly assessing women, establishing rapport and effectively communicating.
- Telehealth may be a suitable adjunct strategy to post-pandemic maternity service provision but should not replace face-to-face contact.

Background

With the global COVID-19 pandemic, telehealth became an integral part in the strategy to reduce SARS-CoV-2 transmission [1,2], with many services being transferred to telehealth platforms [3,4]. Whilst telehealth has been essential for the continuation of health services, the delivery of woman-centred maternity care, enacted best through relationship-based care, is challenging through a virtual communication medium [5].

Prior to the pandemic, telehealth had already been incorporated into health services to improve outcomes, through a suite of technological solutions, such as videoconferencing, telephone usage, digital monitoring and electronic messaging, that enable both synchronous and asynchronous care and benefit to both practitioner and patient [6]. The introduction of telehealth has particularly been beneficial for isolated communities, vulnerable groups and ageing populations, resulting in opportunities for diagnosis, management, information and education at the point of need [6,7]. Thus within the Australian context, telehealth advances have increased the provision of timely medical services to those in rural and remote communities [8].

Telehealth had also been utilised in pre-pandemic maternity care as an adjunct to standard in-person antenatal and postnatal services. Telehealth models included the provision of breastfeeding support [6,9], support for self-managed asthma care [10], the monitoring of blood pressure, blood glucose levels, cardiotocography and ultrasound [11, 12], the reporting of test outcomes and the issuing of appointment reminders [13]. A pre-pandemic randomised control trial found greater satisfaction for women and lower prenatal stress when a reduced schedule of antenatal visits was supported by remote telephone monitoring, access to an on-line community, and the capacity for women to measure blood pressure and fetal heart rates in their own home [14]. Generally, pre-pandemic studies found that women and healthcare providers were satisfied with the inclusion of telehealth as a component of antenatal care services [14–16], with similar health outcomes being seen to those receiving in-person care, with the exception of pre-eclampsia [17] which was less likely to be detected. However, for the most part, pre-pandemic telehealth services were limited to distinct aspects of antenatal care [18].

Despite comparatively low COVID-19 rates, Australia reduced face-to-face maternity services, by rapidly pivoting to telehealth in an attempt to reduce transmission risk [19]. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG), recommended increased timeframes between antenatal visits, and the utilisation of telehealth as a replacement or addition to routine services [20]. In March 2020, telehealth services were added to the Medical Benefits Schedule by the Australian Government in order for antenatal telehealth services to be subsidised [21]. In Australia, in-person antenatal services decreased by 8.3% in the second quarter of 2020, when compared to the same reporting period in 2019 [22]. Medicare data in the period between March - December 2020 reported approximately 126,000 instances of telehealth care, comprising up to 1 in 5 antenatal appointments delivered via telehealth [22]. The aim of this study was to examine childbearing women and midwives' experiences of using telehealth during the COVID-19 pandemic.

Methods

Birth in the Time of COVID-19 (BITTOC) is a mixed methods study exploring the perspective of women, midwives and student midwives in relation to pregnancy and childbirth care in Australia during the COVID-19 pandemic (Fig. 1). One of the research questions in the BITTOC study was about the impact that telehealth (defined in this paper as synchronous maternity care by telephone or video) had on women and midwives. Human research ethical approval was granted by the Western Sydney University (H13825) and Charles Darwin University (H21052) Human Research and Ethics Committees.

Data collection

Women's data

In-depth interviews were conducted between March – December 2020, with 20 Australian women who had been pregnant or given birth during the pandemic, who were recruited via social media. These interviews informed the development of the BITTOC 2020- and 2021-women's surveys which were distributed nationally through social media, parenting forums and consumer organisations. The 2020 women's survey did not seek open-ended responses relating to telehealth and as a result only responses from the 2525 women responding to the 2021 survey are included (n = 812).

Inclusion criteria for all participating women were being: over 18 years of age, pregnant or giving birth during or after March 2020, able to fluently speak and write English. Exclusion criteria were those: living outside of Australia and not having access to computer and internet services.

Midwives' data

In-depth interviews were conducted between May and August 2020 with 16 Australian midwives, who were recruited via social media. These interviews informed the development of the national BITTOC midwives surveys conducted in 2020 and 2021. The midwives survey involved recruitment through social media and professional bodies such as the Australian College of Midwives. The 2020 survey was completed by 477 midwives and the 2021 survey was completed by 210 midwives (n = 687). Open-text responses relating to telehealth were included in this study (n = 212).

Inclusion criteria for all participating midwives were: being a registered midwife working in the Australian public or private health care system, providing maternity care after March 2020.

Informed consent

Electronic informed consent was obtained from women and midwives, with each participant being made aware of their right to withdraw at any time without recrimination. In each stage of the research, participant confidentiality was ensured with identifying features removed from the data prior to analysis.

The dataset for this paper was extracted from the in-depth interviews with midwives and women, as well as from the open-ended questions embedded within the survey. Questions from the survey are provided in Table 1.

Data analysis

Data was analysed using content analysis, which utilises inductive reasoning to systematically categorise collected data through the analysis of word and theme frequency as interpreted by the researchers [23, 24]. It requires a five-step process including research question development, the formation of a coding frame, review and revision of the coding frame, coding of the full data set and presentation of findings [24]. Interviews were verbatim transcribed using Rev.com transcription services [25]. Transcripts were read and re-read to ensure familiarisation with interview data. The coding frame was tested and refined through the analysis of the open-text survey responses. Codes were counted to identify the major themes within the data set. Categories and sub-categories from the coded data were developed, discussed and agreed upon by the researchers. Where analysed data related to more

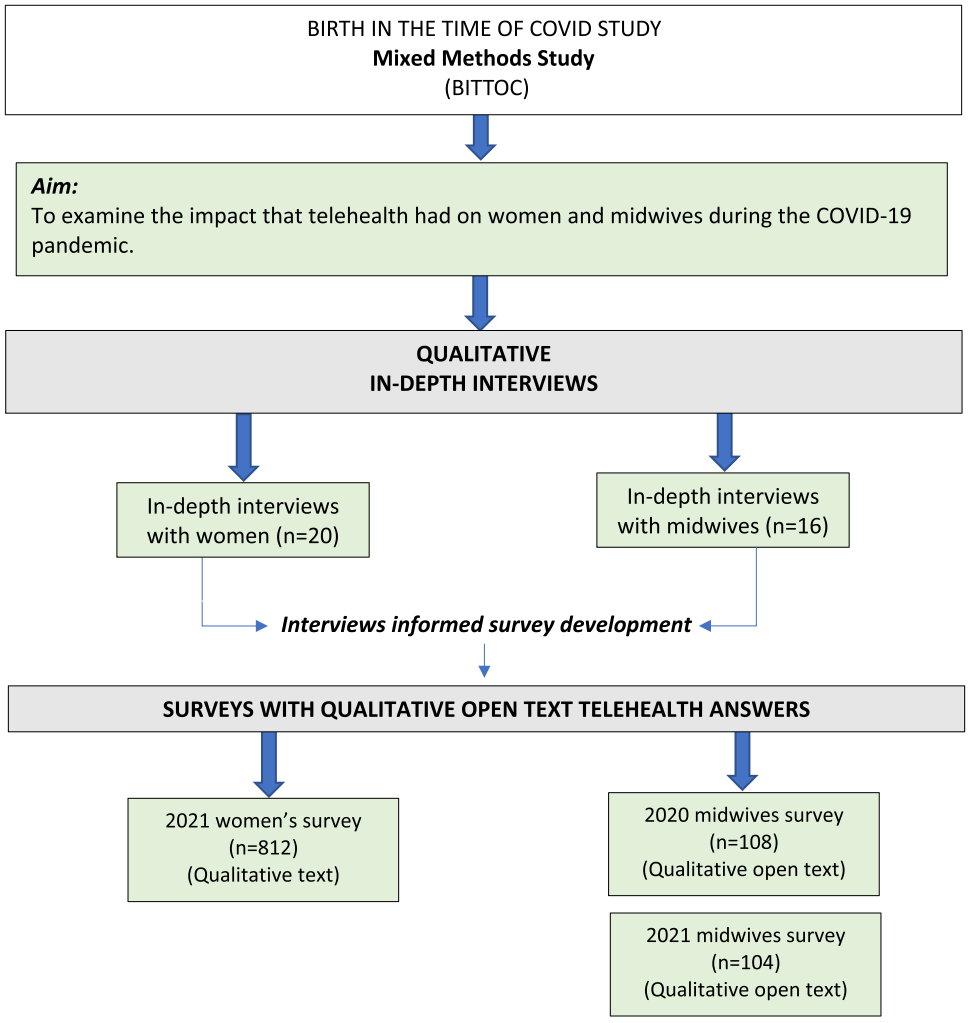

Fig. 1. Study design.

Table 1
Open-text survey questions.

Women's survey (2021)	Q. 592	Do you want to make any comments on how you found Telehealth during your (pregnancy)?
	Q. 593	Do you want to make any comments on how you found Telehealth (postnatal)?
Midwives survey (2020 and 2021)	Q 5.4_5	Open text relating to general telehealth comments
	Q 12.3	Do you have anything to add regarding technical difficulties that you have experienced when using telehealth?
	Q 12.7	Do you have any further comments to make about the use of telehealth?
	Q 25.4	Please provide further comments about change to care given to women as a PPM during the COVID-19 pandemic

than one code, it was coded into multiple categories. In order to promote reliability, coding was first conducted by the primary reviewer (EC), prior to the secondary reviewer (HD), who was also familiar with the data. The data was then re-reviewed and the codes re-examined before finally being agreed on by EC and HD. Emergent categories and sub-categories were repeatedly discussed and reviewed throughout the data analysis phase. EC had no prior involvement in the development of the study protocols [26]. Coding was undertaken in NVIVO (QSR International release 1.5, 2020) and through the use of Excel.

Findings

Demographic data collected from the women and midwives are provided in Supplementary tables (1–4). In total 55% of women stated they had care during pregnancy via telehealth. The length of these telehealth appointments varied but were most commonly 10–15 min (21%), with only 3.64% of appointments being over an hour long (see Fig. 2).

Coding frames were developed from the women's (20 interviews and 812 open text telehealth related responses), and midwives' (16 interviews and 212 open text telehealth related responses) data, with 20 and 16 codes identified respectively. From these, four categories were identified as applicable to both datasets namely: women were let down by the system, telehealth was beneficial for some women but not all, inconsistency in telehealth and technical limitations. Within these four categories, nine subcategories were identified from women's responses (Table 2), and 10 from the midwives' data (Table 3). The frequency distribution of telehealth quotes in number and percentage for each category and sub-category for both women and midwives is presented in Tables 2 and 3.

Category 1: women let down by the maternity care system

Findings demonstrated that the move to telehealth during the pandemic impacted maternity services on multiple levels, and predominantly negatively. Overall, the general view held by midwives was

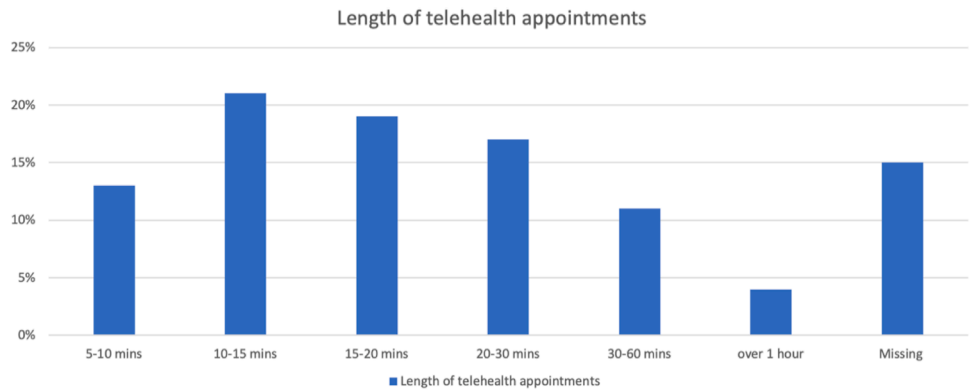

Fig. 2. Women's reports on length of telehealth appointments.

that women were let down by the maternity care system during the pandemic. Women also agreed with this. Sub-categories from both women's and midwives' data included limitations to communication, education, rapport, clinical and psychosocial assessment, and the expected reduction in face-to-face visits.

Although telehealth was of benefit for some women, the large-scale implementation produced multiple restrictions and omissions in care which at times resulted in poor outcomes for women and their babies.

> *"….[a woman] who had never had a single face-to-face consult their entire pregnancy - her baby was tiny when she was seen by us, and her BP was sky high - that woman and her baby did not get any benefit from telehealth!" (2020 Midwives survey – Q 12.7 open ended response)*

> *"No one's doing a full assessment. No one's picking up the tongue tie that he had, until noticing that he's too small.… but he's still only in the third percentile of the weight range." (Woman's interview – No. 6)*

Midwives were frustrated regarding the manner in which they were required to deliver care and identified limitations in assessment and preparation when women gave birth.

> *"And I feel like they're being completely let down by the system, and I feel devastated they don't have an experience of genuine care and education. I feel like they're coming in and so vulnerable to those things that I hate about the system, in terms of just being coerced into antibiotics or an epidural." (Midwife interview – No. 11)*

A small number of women reported feeling isolated and forgotten during their pregnancy, feeling that they were falling through the cracks.

> *"I did feel a little bit umm, like- forgotten at times." (Woman interview – No. 2)*

> *"So, everyone is worrying about this big bad out there and they are not really focusing on the small cracks that everyday people are getting lost into." (Woman interview – No. 3)*

Women who had previously had a baby were more aware of the changes and stated, *"I am grateful it was our second baby, not our first. It would have been a lot had it been our first baby." (Woman interview – No. 13)*.

In contrast, women receiving care through a continuity model, especially with privately practising midwives, predominantly receive individualised care that catered to their specific needs and therefore felt the least impact.

> *"…so, the visits were at home it was kind of just easier in that regard, and she knew me antenataly, she knew that I was isolating, she knew that I didn't have an exposure risk, theoretically. Umm, so then going into birth and labour was a lot easier I think as well. Umm, and essentially it meant that not really much at all changed for my care." (Woman interview – No. 5)*

Sub category - limitations with communication, rapport and education

Overall telehealth was regarded as having a negative impact on communication. When telehealth involved telephone conversations women and midwives reported difficulty with not seeing each other's facial expressions and body language. This resulted in a reduced ability to build rapport and impacted upon women's ability to discuss their concerns.

> *"I didn't like the telehealth appointments. I felt like there was no connection between the provider and myself. I couldn't read body language over the phone so felt more uncomfortable sharing with them." (2021 women's survey - Q 592 woman's survey comment)*

Telehealth was also particularly problematic for women from non-English speaking backgrounds requiring interpreters and for those with hearing difficulties, due to reduced availability. *"This was difficult as many women have English as a second language." (Midwives survey Q 12.3 – open ended response)*.

Similarly, with the significant reduction of or ceasing of face-to-face childbirth education services, limitations with online education models were noted.

> *"It was great to get the information out but tricky in terms of a personalised approach when a number of women are attending. Hard to read body language and facial expressions when the women are in little boxes on the screen. These body cues are important when you are training as you can pick up from the audience if you need to go over something or it has been understood." (Midwives survey Q 12.3 – open ended response)*

Consequently, some women, particularly primiparas, were uncertain regarding the normal physiological changes experienced during labour and birth and often arrived to birth their babies under-prepared and uncertain.

> *"Women were coming to us with no idea, … of what to expect, no idea of processes, pain relief options, …. So, it was definitely something that was noticeable." (Midwife interview – No. 13)*

Sub category - limitations to clinical assessment

Clinical assessment was significantly affected by the move to telehealth, with telehealth impacting the frequency and quality of physical assessment for the woman. Women and midwives both voiced concern regarding the reduction and lack of physical assessment, such as blood pressure, abdominal palpation, fundal height measurement and fetal heart rate monitoring, which was unable to be performed by midwives.

Table 2
Content analysis women's interviews and 2021 survey open text survey responses.

Category	Sub category	Women's interviews 2020 (n = 20)	Women open text survey responses 2021 (Q. 592/Q.593) (n = 812)
Women let down by the maternity care system	Limitations to communication, education and rapport	10 (50%) of women discussed the limitations to communication, education and rapport	205 (25%)
	Limitations to clinical assessment	9 (45%) of interviewed women discussed limitations to clinical assessment	150 (18%)
	Limitations to psychosocial assessment	5 (20%) of interviewed woman discussed the limitations of telehealth	9 (1%)
	Large reduction in the number of face-to-face visits	12 (60%) of women noted a large reduction in face-to-face visits with some women not physically seen till late in pregnancy	23 (3%)
Beneficial for some but not all women	Telehealth has benefits and has a place (benefits multiparas and those with young children, reduces covid risk, reduces travel)	6 (30%) of interviewed women stated that telehealth has a place	311 (38%)
	Disliked telehealth (women felt forgotten, wanted to be face-to-face, made women anxious)	7 (35%) of interviewed women disliked telehealth	278 (40%)
	Telehealth may not be suitable for some women (primps, complex pregnancies, those who prefer face-to-face)	6 (30%) of interviewed women noted that telehealth may not be suitable for first time mothers	21 (3%)
Inconsistency in telehealth	Diversity in the mode of telehealth (phone/skype/ zoom) Inconsistencies in telehealth scheduling	17 (70%) of woman discussed inconsistency in the mode and scheduling of telehealth	191 (24%)
Technical limitations	Issues with reception, connection and availability	0 (0%) Interviewed women did not raise technology as an issue	38 (5%)

"Telehealth is fine except they can't look at me physically. Nervous heart beat isn't checked and not being measured." (2021 survey - Q 592 woman's survey comment)

"It doesn't allow us to perform an abdominal palpation or listen to a fetal heart rate, which is important in our work to confirm fetal wellbeing." (Midwives survey 2020 – Q 12.7 open ended response)

Some women were asked to monitor their own fundal heights and blood pressure, *"….cause we are asking women to do their own fundal heights as well, umm, which is very challenging, and so some women are choosing not to do that. (Midwife interview – No. 6)*. Midwives stated that women were then arriving in labour with limited information recorded.

"Two of them [women] had had no antenatal care…. one of them had not even had a scan, absolutely nothing. And another one hadn't been seen since 26 weeks….I have no idea whether there has been any concerns, any growth or blood pressure or anything else that happened in the last three and a half months or even more for some women." (Midwife interview – No. 11)

The lack of physical assessment resulted in some women having increased feelings of anxiety and uncertainty regarding the progression of their pregnancy, *"I wanted to hear my baby and couldn't which made me anxious." (Women's survey 2021 – Q. 593 open ended response)*. Some midwives also reported a subsequent rise in maternal anxiety with women more frequently calling the hospital to report decreased foetal movements, as they were not reassured by a telehealth visit, *"We had a ….lot more than normal decreased fetal movements calls … because they hadn't known … their baby was okay when they had their last appointment." (Midwife interview – No. 5*). Postnatal care was also impacted with midwives and Maternal and Child Health workers using telehealth in the car outside the woman's home and then conducting fast run in and out physical checks.

"Highly inappropriate for pregnancy and post-natal care. My postpartum 6-week check was changed to Telehealth so my stitches weren't even checked which I didn't feel was acceptable, especially after some complications during birth." (Women's survey 2021 – Q. 593 open ended response)

Sub-category - limitations to psychosocial assessment and depression screening

Telehealth was considered inappropriate for domestic violence and perinatal mental health screening. This was due to the midwife's inability to identify if the woman was alone, in a safe environment, and able to respond to the screening, *"Makes it much easier for things to get missed ….less able to engage in conversation about sensitive topics over the phone (2020 midwives survey - Q. 12.7 open ended response)*.

These challenges resulted in some women not receiving a psychosocial assessment appointment until the third trimester of their pregnancy, though some services would offer a brief face-to-face visit for psychosocial screening after a telehealth appointment. Furthermore, some women were aware of the limitations to psychosocial screening and identified this as a risk for those who needed this level of support, *"I'm mostly surprised because I have a lot of risk factors for postnatal depression, and they know that. So, I'm surprised they haven't screened me." (Woman interview – No. 16)*.

Some women experienced a hybrid version of telehealth, whereby quick physical checks were preceded by a telephone call, sometimes in a common waiting room. However, telephone calls in public settings were experienced as uncomfortable and the lack of privacy impacted negatively on the ability to conduct a comprehensive assessment.

"I attended several appointments where the midwife would telephone while I was in the waiting room and go through questions…. they would then call you into the exam rooms after to complete the physical checks. My understanding is that this is to limit time spent in close proximity to the staff. I found this mode of appointment to be really distressing, as there were many things I wanted to discuss with the midwife that were very personal, so didn't want to do so from the waiting room." (2021 women's survey – Q. 593 open ended response)

Conversely, some women described telehealth appointments with their psychologist as convenient and supportive, demonstrating a potential role in some circumstances where physical assessment is not needed and perhaps a relationship with the care provider already exists, *"Telehealth has been amazing in terms of mental health support – my*

Table 3
Content analysis midwife interviews and open text survey 2020 and 2021 responses.

Category	Sub category	Midwife interviews 2020 (n = 16)	Midwife open text responses 2020 (n = 108)	Midwife open text responses 2021 (n = 104)
Women let down by the system	Limitations to communication, education and rapport	12 (75%) of interviewed midwives discussed limitation to communication, education and rapport	32 (30%)	14 (13%)
	Limitations to clinical assessment	9 (56%) of interviewed midwives discussed limitations to clinical assessment	9 (8%)	16 (15%)
	Limitations to psychosocial assessment	6 (38%) of interviewed midwives discussed limitations to psychosocial assessment	22 (20%)	30 (28%)
	Large reduction in the number of face-to-face visits with some women not seen till late in the pregnancy	11 (69%) of interviewed midwives discussed the large reduction in face-to-face appointments	9 (8%)	8 (7%)
Beneficial for some but not all women	Telehealth has benefits for midwives	2 (13%) of interviewed midwives discussed the benefits of telehealth for midwives	18 (17%)	12 (12%)
	Telehealth has benefits for women	5 (31%) of interviewed midwives discussed the benefits of telehealth for women	17 (16%)	24 (23%)
	Some midwives dislike telehealth or find it a challenge	6 (38%) of interviewed midwives discussed their dislike of telehealth and its challenges	11 (10%)	12 (12%)
	Telehealth has a place, but may not be suitable for some women (primiparas, high risk, those who prefer face-to-face)	8 (50%) of interviewed midwives identified the women that telehealth may not benefit	26 (25%)	14 (13%)
Inconsistency in telehealth	Diversity in the mode of telehealth (phone/skype/zoom)	12 (75%) interviewed midwives discussed inconsistency in the mode and scheduling of telehealth	45 (42%)	36 (35%)
	Inconsistencies in telehealth scheduling			
Technical limitations	Issues with reception, connection and availability	5 (31%) of interviewed midwives discussed limitations to technology	28 (26%)	33 (32%)

psychologist." (2021 women's survey – Q. 593 open ended response).

Reduction in the number of face-to-face visits

The reduction in the number of face-to-face antenatal visits resulted in women feeling 'forgotten' and anxious regarding the progression of their pregnancy. Some women didn't have access to a face-to-face appointment until late in their pregnancy with a small number of women not being seen in person throughout their entire pregnancy.

> *"I haven't had a in person consult at all. Despite telling them how concerned I am. They simply made me wait a month. After losing my booking info and not booking me till 16.5 weeks. And not making the first hospital appointment till 22 weeks. I feel unseen. And worried about if I'm not doing enough to make sure my baby is safe." (2021 women's survey – Q. 592 open ended response)*

> *"Lots of girls were saying when they came in that they had hardly seen anyone because all of their general appointments were over the phone." (Midwife interview - No. 5)*

Category 2: beneficial for some women but not all

Despite the identified limitations of telehealth, there were some benefits identified by women and midwives. Some women, particularly multiparous women enjoyed the flexibility and convenience of telehealth, especially when other children needed to be cared for during appointments or when women had work commitments, *"It was more convenient in some ways because it involved less time out of work." (2021 women's survey – Q.593 open ended response)*.

Women who were fearful of being infected with COVID-19 also said they enjoyed the sense of safety that telehealth provided. Others reported that not having to travel to appointments and waste time in waiting rooms was beneficial, *"It's a great option for those women who felt scared to leave home in case they contracted COVID, as it enabled us to maintain some care and contact." (2020 midwives survey – Q.12.7 open ended response)*.

Additionally, some midwives found that telehealth was less time intensive and that it resulted in the smooth running of the maternity unit, which enabled them to better manage their workload, *"Convenient when AN* [antenatal] *clinic is at capacity/overbooked, easier to keep appointments on a schedule and avoid staying back unpaid which happens often in our AN clinic." (2020 midwives survey – Q.12.7 open ended response)*.

However, even amongst those who were able to report benefits from telehealth, it was seen as a good option but not a panacea, *"Easy to access for me but not a replacement; great as an adjunct." (2021 women's survey – Q.593 open ended response)*.

> *"Telehealth was helpful for some appointments. But didn't replace the face-to-face quality." (2021 women's survey – Q.593 open ended response)*

Category 3: inconsistency in telehealth

Women and midwives reported inconsistencies regarding the quality and type of telehealth services available, and the logistics of telehealth scheduling. The implementation of telehealth was seen as reactive and rushed, with services scrambling to provide quality care within the context of an unprecedented global event, *"We've had lots of changes in terms of our antenatal clinics, we are trying to utilise telehealth now as our primary means of antenatal appointments with women." (Midwife interview – No. 6)*.

Some women continued with their pre-pandemic visiting schedule and did not receive any telehealth, others had alternate telehealth and face-to-face visits, whereas the majority received their care via telehealth. Telehealth delivery also varied widely with some services offering Zoom and Skype conferencing, however most services were provided via telephone, *"Only telephone available." (2021 midwives' survey – Q. 12.3 open ended response)*. Not all midwives were skilled in telehealth technology, thereby requiring a steep learning curve, under difficult circumstances, *"The new Telehealth system is much more complex than using zoom, so I usually just call. I still prefer face-to-face & so do the women." (2021 midwives' survey – Q. 12.3 open ended response)*.

It appeared that there was also an inconsistent approach to implementation, with some services viewing telehealth as optional, *"We have the option to use telehealth and have been provided with equipment to do so but it is up to our discretion." (2021 midwives survey – Q.5.4_5 open ended response)*. However, for many others telehealth was mandated for the majority of appointments, *"There were mandated telehealth visits, but*

clinical judgement to be used, so these could be face-to-face if the clinician deemed it preferable/necessary." (2020 midwives survey 2020 – Q.12.4_5 open ended response).

Category 4: limitations to technology

Overall, technical and logistical issues were identified as negatively impacting upon the quality of telehealth services provided. Infrastructure for example was an issue, that resulted in phone calls rather than video conferencing being the primary mode of telehealth being offered. Midwives reported that difficulties with connectivity, reception, audio and screens freezing resulted in ineffective use of appointment times, that negatively impacted on the quality of time spent with women, *"It freezes, the app doesn't work, or the computers don't have webcam." (2020 midwives survey - Q 12.7 open ended response)*. Women also raised technical challenges as a concern, however this was less frequently the case than with midwives and tended to be more to do with specific locations, "*I live in an area with limited reception so it cuts out regularly and it is often difficult to reconnect. I sometimes have to stand in the middle of the street for a signal which isn't ideal when talking about private issues." (2021 women's survey – Q.592 open ended response)*. Technical issues were unsurprisingly more apparent in rural and remote areas, *"The difficulties in maintaining some telehealth connections really highlights the poor nature of Australia's rural and regional internet connections." (2020 midwives survey – Q.12.3 open ended response)*.

Compounding these difficulties were scheduling and equipment issues, language barriers and women missing appointments or electing not to use available video conferencing. "*…with 3-way calls with interpreters and people not being able to hear on speaker phone, however only I received a headset and was told they couldn't afford them for everyone else! Such a disgrace*." *(2021 midwives survey – Q.12.3 open ended response)*.

Discussion

The COVID-19 pandemic resulted in significant changes to the delivery of maternity services around the world, leaving women and midwives to navigate a rapidly-changing landscape [27,28]. In Australia during this time, telephone consults occurred more frequently than video conferencing, and accounted for 87.5% of delivered telehealth services [22]. Various Australian studies exploring the impacts of COVID-19 on maternity services during the pandemic have reported mixed findings with respect to: telehealth rates [29], telehealth implementation [4,30], the convenience of telehealth [31], midwives experiences of care provision during the pandemic [32] and the effects of telehealth on antenatal screening [33]. Midwives in Australia for example reported that the increase in the use of telehealth services during the pandemic had limitations, with comprehensive physical and psychological assessment being a primary concern [32]. International studies into maternity care during COVID-19 have also examined the impacts of telehealth with respect to implementation [1,34]; satisfaction, dissatisfaction and acceptability of telehealth in maternity services [35–39]; physical and psychosocial assessment [40–43]; monitoring of hypertension and diabetes [44]; perinatal outcomes [45]; and the benefits of telehealth support for women with COVID-19 [46]. Our study adds to this body of knowledge by describing the perspectives of Australian women and midwives in relation to the introduction of telehealth services during the COVID-19 pandemic. We identified that inconsistencies in telehealth implementation, technological challenges, and limitations in assessment, education and support, contributed to many women feeling let down by the maternity care system. However, multiparous women and those concerned with the potential risk of COVID-19 infection from face-to-face maternity care identified telehealth benefits, such as convenience and safety.

During the pandemic, no national guidelines for telehealth use in maternity services were provided in Australia, hence various state health departments in Western Australia [47], New South Wales [48], and Queensland [49] provided differing recommendations to reduce transmission, without being prescriptive regarding telehealth schedules or mode of delivery. This variability in recommendation was reflected in our study with women and midwives describing an inconsistent ad-hoc approach, that appeared to be left to the discretion of individual local health districts and in some instances, individual providers, with obvious detrimental impacts to physical and psychosocial assessment and care.

In our study midwives were concerned that telehealth had detrimentally impacted upon women's and babies' safety, with impacts on antenatal assessments, such as abdominal palpation, fundal measurement, blood pressure monitoring and foetal heart rates being discussed. These issues have been highlighted in other studies [1,4,30,32]. Accordingly, a previous study of maternity care health providers concluded that telehealth was unsuitable for women with high-risk pregnancies [33].

Our study identified that reduced face-to-face appointments impacted on women's emotional well-being, with some women reporting feeling anxious, isolated and fearful. This is consistent with previous research finding greater pregnancy-related anxiety amongst women not receiving needed maternity care during the pandemic, particularly amongst nulliparous women [50,51]. In addition, midwives, and to a lesser extent women, described limitations with telehealth for psychosocial screening, due to lack of privacy and rapport development. This is of concern, as a lack of assessment and identification of mental health problems and subsequent inadequate access to psychological support and treatment [52] detrimentally impacts birth outcomes, maternal postnatal mental health [53] and child development [54]. For example, perinatal mental health disturbances increase the risk of preterm birth [55], maternal-infant bonding issues [56], maternal suicidality [57] and child growth and socio-emotional behavioural issues [58,59]. The reported rise in perinatal depression and anxiety during the pandemic should arguably have led to increased, rather than reduced psychosocial screening and support during this time [40–42], however the health system was under great pressure and had a duty of care to keep patients and care givers safe.

Our study further identified that technological limitations such as poor reception, connectivity and access to appropriate equipment impacted telehealth appointments and reduced accessibility. Midwives were frequently frustrated with technological limitations, describing negative impacts on the care provided to women. The impact of technological limitations has been identified previously [43,60], with technological difficulties being suggested in one study to be the greatest obstacle to telehealth [39], that for example result in increased appointment times and hampered information exchange between women and midwives [60]. This study also identified that digital literacy, equipment accessibility and connectivity for rural and remote areas impacted upon the effectiveness of telehealth. Equitable access to appropriate technology and high-speed internet connection is fundamental for telehealth services [61,62], as is digital literacy amongst women and clinicians [63,64], so as to not further widen existing health inequities [1,64]. Previous findings have however suggested that it was not always clear if women were properly educated in the use of telehealth technology and whether these tools were a positive adjunct to telehealth [65]. Women in this study appeared less concerned with technical difficulties than midwives. This may reflect that birthing women are generally younger than midwives and perhaps more technologically savvy.

In addition to describing the limitations and shortcomings of telehealth implementation, a number of women and midwives within our study also identified some benefits of telehealth when used in conjunction with face-to-face visits for physical and psychosocial assessments. Identified benefits included convenience for women who worked or had children, reduced travel time and a lessened potential for COVID-19 transmission. A small number of participants wanted telehealth to be incorporated into future maternity care. Other studies have

also found that women preferred their antenatal delivery to be a combination of telehealth and in-person visits [36], that women [31,36–38] and healthcare providers were satisfied with telehealth [37,39], that telehealth was convenient [36], and that technological problems were minimal [36,37]. Indeed, several authors have discussed the benefits of integrating telehealth and face-to-face services [16,36,66,67]. We conclude that telehealth is a part of modern maternity healthcare and is here to stay. The focus should now be on when and how telehealth should be used and with whom, and how use should be negotiated with women as an adjunct, rather than replacement to face to face care.

There are several limitations to this study. We have only examined the views of midwives and childbearing women in Australia and therefore cannot comment on the experience and acceptability of telehealth to other health providers or other countries. While we have representation from women and midwives across Australia, the fact that the survey was online inevitably means those who do not have these facilities would not be able to respond. Additionally, as the survey was also not translated, migrant and refugee experiences may be underrepresented where English is not the first language. In both cases, the increased use of telehealth during the pandemic may have disproportionally negatively impacted upon these minorities.

Conclusion

Despite the identified benefits of telehealth, we advise caution prior to a universal uptake/continuation of telehealth use in maternity care in the post-pandemic environment. When introduced in a robust, systematic manner, telehealth has the potential to meet specific needs of women (for example multiparous women) and health providers, reduce face-to-face costs and relieve pressure on overburdened health care system. Increased knowledge regarding the benefits and challenges of telehealth use in maternity services may assist policy makers in the development of guidelines and influence practitioners to support women through the provision of respectful and comprehensive care, so as to maximise telehealth potential. Investment into infrastructure, service quality and staff education would strengthen the usability of telehealth as an adjunct to face-to-face services. While there is a place for telehealth within maternity care services it should be an adjunct to face-to-face care, rather than a replacement, and this should be negotiated with the woman to meet her individual needs. Telehealth models need to be co-designed with input from both care providers and women to ensure that a broader approach than simple telephone and videoconferencing consults ensue, and that women feel well cared for.

Ethical approval

Ethical approval for this project was obtained from the Western Sydney University (H13825) and Charles Darwin University (H21052) Human Research and Ethics Committees.

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CRediT authorship contribution statement

Emma Collins (Research Assistant): Data analysis, Investigation, Writing – original draft, Writing – review and editing**. Hazel Keedle** (PhD): Review and editing**. Melanie Jackson** (PhD): Data analysis, Review and editing**. Belinda Lequertier** (PhD) – Writing, Review and editing**. Virginia Schmied** (PhD): Review and editing**. Jacqueline Boyle** (PhD): Writing, Review and editing**. Sue Kildea** (PhD)**:** Writing, Review and editing**. Hannah Dahlen** (PhD): Conceptualisation, Methodology, Validation, Resources, Data curation, Writing, Review and editing, Supervision, Project administration.

Conflict of interest

The authors declare no personal or financial relationships that influence the development of this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.wombi.2023.12.008.

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