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Remote and technology-mediated working during the COVID-19 pandemic: A qualitative exploration of the experiences of nurses working in general practice (the GenCo Study)

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Abstract

Aim: To explore how nurses working in general practice experienced remote and technology-mediated working during the COVID-19 pandemic.

Design: Exploratory qualitative study with nursing team members working in general practices in England and national nurse leaders.

Methods: Data were collected between April and August 2022. Forty participants took part in either semi-structured interviews or focus groups. Data were analysed using Framework Analysis informed by the PERCS (Planning and Evaluating Remote Consultation Services) Framework. University of York ethics approval [HSRGC/2021/458/I] and Health Research Authority approval were obtained [IRAS:30353. Protocol number: R23982. Ref 21/HRA/5132. CPMS: 51834]. The study was funded by The General Nursing Council for England and Wales Trust.

Results: Participants continued to deliver a significant proportion of patient care in-person. However, remote and technology-mediated care could meet patients' needs and broaden access in some circumstances. When remote and technology-mediated working were used this was often part of a blended model which was expected to continue. This could support some workforce issues, but also increase workload. Participants did not always have access to remote technology and were not involved in decision-making about what was used and how this was implemented. They rarely used video consultations, which were not seen to add value in comparison to telephone consultations. Some participants expressed concern that care had become more transactional than therapeutic and there were potential safety risks.

Conclusion: The study explored how nurses working in general practice during the COVID-19 pandemic engaged with remote and technology-mediated working. It identifies specific issues of access to technology, workload, hybrid working, disruption to therapeutic relationships, safety risks and lack of involvement in decision-making. Changes were implemented quickly with little strategic input from nurses. There is

now an opportunity to reflect and build on what has been learned in relation to remote and technology-mediated working to ensure the future development of safe and effective nursing care in general practice.

Impact: The paper contributes to understanding of remote and technology-mediated working by nurses working in general practice during the COVID-19 pandemic and indicates to employers and policy makers how this can be supported moving forward.

Reporting method: Standards for Reporting Qualitative Research (O'Brien et al., 2014).

Patient or public contribution: This was a workforce study so there was no patient or public contribution.

Implications for the profession and patient care: The paper highlights specific issues which have implications for the development of remote, technology-mediated and blended working for nurses in general practice, care quality and patient safety. These require full attention to ensure the future development of safe and effective nursing care in general practice moving forward.

KEYWORDS

COVID-19 pandemic, general practice, general practice nursing, nursing, PERCS framework, primary care, qualitative, remote consultations, telephone consultations, video consultations

1 | INTRODUCTION

There have been significant changes in the ways general practice care has been delivered throughout consecutive waves of the COVID-19 pandemic in England and internationally (Mroz et al., 2022; Rawaf et al., 2020; Verhoeven et al., 2020; Wherton et al., 2020). This has involved moving to remote and technology-mediated care delivery and delivering in-person care differently (Greenhalgh et al., 2022; Hardie et al., 2022; Li et al., 2022). Research has focused on general medical practitioners' experiences of remote and technology-mediated care delivery during this time (Li et al., 2022), with less attention on the experiences of nurses working in general practice. Research conducted early in the COVID-19 pandemic across a variety of primary care settings highlighted how nurses maintained a central role in patient care through adapting their practice, incorporating technology and working remotely from patients (Ashley et al., 2022; James et al., 2021). However, while these ways of working provided benefits during 'lockdowns' and social distancing, challenges were also identified (James et al., 2021). The rate to which technology-mediated and remote working were introduced into clinical practice during the COVID-19 pandemic was unprecedented. It is therefore crucial to explore how remote and technology-mediated care can add most value moving forward (Halcomb et al., 2023), by drawing on the experiences of nurses in delivering remote and technology-mediated working during consecutive waves of the COVID-19 pandemic.

In this paper, we report on how remote and technology-mediated nursing care was delivered in general practice during consecutive waves of the COVID-19 pandemic. This paper is one of two papers from the wider 'GenCo Study' which aimed to explore nurses' experiences of working in general practice during the COVID-19 pandemic (Anderson et al., 2022). Central to study data were (1) how remote and technology-mediated working affected nursing practice and (2) the well-being of nurses during this time. Due to the importance of both issues, and the rich, detailed data collected, each aspect is reported in two discrete but linked papers. The effects of working in general practice during the COVID-19 pandemic on the well-being of nurses are described elsewhere (Anderson et al., 2023). In this paper, we address how nurses experienced remote and technology-mediated working.

2 | BACKGROUND

The ways general practice delivers care have changed rapidly and significantly as a result of the COVID-19 pandemic and associated government directives in the United Kingdom and internationally (Mroz et al., 2022; Rawaf et al., 2020; Verhoeven et al., 2020; Wherton et al., 2020). Initially, general practice patient consultations moved from predominantly in-person to almost exclusively remote (71%–89%) including telephone (61%), online (4%) and SMS/email (6%) (Mroz et al., 2022; RCGP, 2020; QNI, 2020). Changes continued through consecutive waves of the COVID-19 pandemic, with general practices adopting remote consultations at a pace and scale which, pre-pandemic, was considered too difficult to implement (Greenhalgh et al., 2022; Wherton et al., 2020). However, while it was considered that the COVID-19 pandemic would provide a catalyst for the development of such new ways of working, the lasting effects of remote and technology working that were initially anticipated have not been fully realized or sustained (Greenhalgh et al., 2022). For example, despite the

availability and implementation of various technology solutions, in general practice and wider primary care, telephone consultations were the most commonly used form of remote consultation (Greenhalgh et al., 2021; Halcomb et al., 2023; Hardie et al., 2022; Murphy et al., 2021). While risks to patient safety associated with concerns about not seeing patients in-person have been identified (Ashley et al., 2022; Hardie et al., 2022; Li et al., 2022). Therefore, it is imperative to explore the experiences of nurses working in general practices in order to understand how remote and technology-mediated care can add most value and to plan services and policy design moving forward.

Nurses working in general practice have specific domains of work, knowledge and skills which differ to that of other practitioners (Clifford et al., 2021). Research has demonstrated the value of nursing roles in general practice (Desborough et al. (2016), with a recent systematic review identifying the positive effect primary care nurses have on patient care and outcomes (Lukewich et al., 2022). There are a range of nursing roles in general practice and from necessity, much nursing work is delivered in-person and this impacts on how care was delivered during the COVID-19 pandemic. While 90% of GP consultations were remote during the first wave of the COVID-19 pandemic, by comparison, only to 46% of general practice nurse consultations were conducted remotely (Murphy et al., 2021). Furthermore, complex care such as long-term condition management is predominantly within the domain of general practice nursing (Clifford et al., 2021), but little is known about how this was delivered during consecutive waves of the COVID-19 pandemic and how well it can be adapted to remote and technology-mediated working. Those in nursing support roles, such as healthcare assistants, provide care such as blook pressure checks which, due to the COVID-19 pandemic, have been required to be delivered differently. Consequently, they are of interest as they make an important contribution as part of the wider nursing team. However, they are often under-researched and little is known about how their practice has been affected by changes implemented during the COVID-19 pandemic. Advanced nurse practitioners working in general practice often carry out work that can be considered to be more aligned with that of general medical practitioners. It is therefore important that working practices and care delivered by all levels of nurses working in general practice during the COVID-19 pandemic are examined to inform future practice and policy making.

3 | THE STUDY

This paper reports how remote and technology-mediated nursing care was delivered in general practice during consecutive waves of the COVID-19 pandemic. It is one of two papers from the wider 'GenCo Study' which explored nurses' experiences in general practice during the COVID-19 pandemic (Anderson et al., 2022). In a linked paper (Anderson et al., 2023), we have presented findings from another aspect highlighted by the GenCo study; that of the effect on professional well-being of nurses working in general practice during the COVID-19 pandemic.

3.1 | Aims

In this paper, we report the findings of the GenCo study relating to how nurses working in general practice experienced remote and technology-mediated working during consecutive waves of the COVID-19 pandemic.

4 | METHODS AND METHODOLOGY

4.1 | Design

The study used an exploratory qualitative methodology (Rendle et al., 2019) underpinned by a social constructionist approach. This enabled us to understand the individual and shared experiences of a professional group. Participants from three practice sites within one overarching organization across the north of England, as well as nurses working in general practices across England, were interviewed or took part in a focus group. This was in order to gain depth (case site data) and breadth (national data) of knowledge. Participants included general practice nurses, healthcare assistants, advanced nurse practitioners, a nursing student, nurse/other managers and nurse representatives in primary care networks [PCNs] in order to make our sample inclusive. One GP, who was involved in leading the nursing team within the overarching case site organization was also interviewed to provide organizational context at the case sites. National nurse leaders associated with nursing in general practice were also interviewed to provide national and strategic context and insight. We chose to interview participants within case sites to gain depth of understanding, and this sat alongside national interview studies, which provided breadth of data. The study was funded by the General Nursing Council for England and Wales Trust.

4.2 | Participants

Participants were recruited through two streams: general practice case sites and at a national (England) level. This allowed for variation through two different forms of participant recruitment. For case site data collection, an organization of multiple general practices facilitated recruitment of three case sites in the north of England, which varied in relation to demographics such as location and size of practice, as well as deprivation index. We chose this method of recruitment as the University's Department of Health Sciences has established links with the overarching organization who could provide wide variation in terms of practice, and nursing team, make-up. The organization was willing to support the study despite it being a difficult time for recruitment nationally, due to

the ongoing COVID-19 pandemic, and the pressures on general practices and the National Health Service in England. Recruitment of participants was via the nurse manager at each site. Those members of the nursing team who were interested in taking part [and a GP who worked closely with nursing teams] were supplied with a participant information leaflet and invited to take part by the lead researcher [HA]. Participants could choose an in-person or online interview or focus group.

National recruitment of nurses working in general practice and nurse leaders took place through professional contacts, social media networks and through snowball sampling (Patton, 2015). Key professional contacts were approached by the lead researcher [HA]. These contacts then invited other potential participants to take part in an individual interview. To gain a broad national dataset, we engaged with social media, which is becoming an established method of healthcare workforce research recruitment (Hulse, 2022; Morley et al., 2022). Twitter was specifically used to advertise the GenCo Study because a range of national general practice and community nursing associations have a large presence on Twitter and are able to connect to a broad general practice nursing community. Associations such as @RCN GPN Forum, @The QNI, @WeGPNs @Gpnsnn, @BAMEGPNs and @NAPC_NHS were asked to share study information on Twitter, as were national and local general practice nursing leaders. Those expressing an interest were invited to make contact with the lead researcher and, after receiving a participant information leaflet, were invited to take part in an interview.

Across the study, we aimed to recruit a range of practitioners (general practice nurses, healthcare assistants, advanced nurse practitioners, nursing associates, nurses in management positions) using a maximum variation approach in gender, age, role and professional level. The focus was on variation within the sample rather than aiming for saturation (Braun & Clarke, 2019). Data collection concluded when, in the experience of the researchers, breadth and depth of data had been achieved based on a priori estimates (Baker et al., 2012) and the consideration that it would be both impractical and 'irresponsible' to carry out further interviews during the COVID-19 pandemic (Cable et al., 2023: 2875) when general practices, and their workforces, were under severe strain. Nurses working in national leadership roles relating to general practice during the COVID-19 pandemic were also included, as were other key informants.

4.3 | Data collection

Data collection took place between April and August 2022, following the third wave of the COVID-19 pandemic in the United Kingdom when national restrictions were limited, but restrictions in healthcare settings were still in place. Semi-structured interview/focus groups were conducted remotely (Zoom, MS Teams, telephone) or in-person and either recorded using video conferencing software or a password-protected audio recording device. Topic guides were developed from study aims and objectives and related literature (e.g. Greenhalgh et al., 2017). Interviews lasted between 30 min and 1 h 20 min and focus groups were between 1 h and 1 h 45 min duration. Recordings were transcribed verbatim by a professional transcription service.

4.4 | Data analysis

Data were analysed using Framework Analysis (Pope et al., 2000). This follows a number of steps: data familiarization, thematic framework development, indexing or coding data, charting, mapping and interpretation. Framework analysis allows for a priori concepts and explanatory frameworks to be integrated with open coding. As we knew that technology-mediated and remote working would play a role in participants' experiences, we decided at the outset of the study to use an explanatory framework to analyse the data specific to this. Therefore, to analyse data relating to remote and technology-mediated working, we used the PERCS (Planning and Evaluating Remote Consultation Services) framework (Greenhalgh et al., 2021)—a version of the NASSS (Nonadoption, Abandonment, Scale-up, Spread and Sustainability) Framework (Greenhalgh et al., 2017) specifically adapted for analysis of remote consultations during the COVID-19 pandemic. The PERCS framework (Greenhalgh et al., 2021), has eight interdependent domains (Box 1) through which remote and technology-mediated working can be assessed and evaluated. It recognizes the importance of digital inclusion of the population served and digital maturity of the organization and is underpinned by principles of healthcare quality and ethics. We coded data according to this framework. Alongside this, we carried out open coding to allow for any ideas which did not fit with the PERCS model and this was analysed concurrently. Concepts, ideas and themes were retested by returning to the raw data. Analysis was carried out by HA with input and reflexive discussion from the wider research team [JA, PG, AS]. Descriptive accounts were developed which allowed analytical themes to be developed. The raw data were then returned in order to retest concepts, ideas and themes.

4.5 | Ethical considerations

Health Research Authority [IRAS: 30353. Protocol number: R23982 Ref 21/HRA/5132 and University of York Health Sciences Research Governance Committee [HSRGC/2021/458/I] approvals were obtained. The study was registered on the NIHR CRN Portfolio [CPMS: 51834] and supported by the NIHR Clinical Research Network. Formal local approval was obtained from case sites. The study was carried out as per NIHR Good Clinical Practice and the University of Yorks's research governance guidelines. The study was not considered to present complex ethical issues, as it was a workforce study of nurses working in general practices. Information about case sites and participants is presented in ways which minimize potential identification due to the in-depth nature of qualitative data. All participants gave written consent. There were no participant expenses and no incentives

BOX 1 PERCS framework (Greenhalgh et al., 2021).

Domain	Description
1. Reason for consultation	• Illness/condition • Reason for consultation • Urgency • Patient or clinician initiated • Advice/treatment requested
2. The patient	• Attitude to illness • Attitude to remote consultation • Identity/values/beliefs • Health/digital literacy • Experience of illness/disability
3. The clinical relationship	• Mutual trust and positive regard • How well clinician/ healthcare team know patient
4. The home and family	• Material features/space/layout/privacy • Digital accessibility • Interpersonal dynamics • Family support
5. Technologies	• Functionality • Technical performance • Ease of use • Dependability • Familiarity with technology • Supply, maintenance and repair
6. Staff	• Attitudes/professional norms and values • Digital literacy and confidence • Vulnerability to infection • Levels of exhaustion • Home environment (if working from home)
7. The healthcare organization	• Innovativeness/readiness • Normalization efforts—supporting and engaging staff to participate/ coordinating implementation/monitoring costs and benefits • Hierarchy • Slack in system • Management support • Absence of opponents • Assessment of innovation fit
8. The wider system	• Policy context • Infrastructure e.g. broadband • Interorganizational support and learning

were offered. Participants were aware of their right to withdraw from the study without reason.

4.6 | Rigour, trustworthiness and reflexivity

Reporting is consistent with the Standards for Reporting Qualitative Research (O'Brien et al., 2014), allowing credibility and methodological quality to be assessed through transparent, accurate documentation of the research process. Quality is demonstrated through assessing the relationship between findings and wider literature, findings being recognizable to others in similar settings, and through reflexivity (Hammersley, 1998). 'Naturalistic generalizability' is achieved when research reflects readers' personal experiences and is recognizable to those with shared experience and knowledge (Smith, 2017: 140). Thus, the study can be adjudicated in terms of credibility through readers' engagement and resonance with the paper. Comparing and contrasting similar findings in broader literature further adds authenticity (Hammersley, 1998) and this is reflected in the discussion section. In terms of reflexivity, the lead researcher [HA] is a registered nurse with previous general practice experience, who reflexively considered how this positionality impacted the research. This was discussed by the research team which is made up of clinical (HA, PG) and non-clinical academics (JA, AS) and disconfirming cases in the data were explored.

5 | FINDINGS

5.1 | Participant characteristics

Forty people participated in the study across a range of roles from healthcare assistants to national nurse leaders plus one student nurse and one GP. Experience ranged from those who had qualified during the COVID-19 pandemic to those with over 40 years of experience. $N = 37$ participants were female and $n = 38$ were white. There were $n = 27$ nationally recruited participants and $n = 13$ participants recruited from the three general practice sites. Case sites were ascribed the pseudonyms 'Yew', 'Sycamore' and 'Hawthorn' for reporting purposes and the pseudonym 'Woodlands' was assigned to overarching organization. Table 1 details the participants' roles. We have mapped the findings related to remote and technology-mediated working to Greenhalgh et al.'s (2021) PERCS framework. However, first we set the scene for care delivery during the COVID-19 pandemic.

5.2 | Setting the scene—The challenge of change

Nursing in general practice changed for participants during the COVID-19 pandemic. Working practices developed rapidly throughout this time, but the practical nature of many participants' roles meant that much work continued face-to-face, or in a hybrid or blended manner, and nurses had to develop workarounds to keep themselves and patients safe. Participants were resourceful and embraced new ways of working. They saw the COVID-19 pandemic as an impetus to adapt working practices which were previously considered too difficult to change and used this for the benefit of patient care: *'I think it is a really good opportunity to sort of strip back. We've been talking about changing the way that we did diabetes for a while….And the pandemic allowed that' [Nurse Manager 1 Woodlands]*. Many participants were also central to setting up and running COVID-19 vaccination clinics and played a vital role in infection prevention and control, *'one of the nurse managers….manages a lot of the COVID protocols and infection prevention protocols' [GPN3 Yew Case Site]*.

TABLE 1 Participants.

Participants	Interviewed
General practice nurses	16
Advanced nurse practitioners	8
Nurse managers	4
Nursing associate/Assistant practitioner/Healthcare assistant	1
National nursing leaders	5
Nursing student	1
Other roles	4
General practitioner	1
Total	40

As well as developing new ways of delivering in-person care, nurses also conducted telephone consultations and other remote forms of working, utilizing digital and technology-mediated solutions. This will be explored in more detail in the following section, drawing on Greenhalgh et al.'s (2021) PERCS Framework. PERCS consists of eight domains which 'interact and evolve' as part of a complex system (Greenhalgh et al., 2021: 1). The domains are as follows: reason for consulting, the patient, the clinical relationship, the home and family, technologies, staff, the healthcare organization, and the wider system. The domains are further detailed in Box 1. While each domain is presented in turn, it is acknowledged that system complexity means these crosscut.

5.3 | Findings aligned with PERCs domains (Greenhalgh et al., 2021)

5.3.1 | Reason for consultation

As noted, general practice nurse and healthcare assistant participants continued to deliver a large proportion of care in-person. This contrasted with ANPs in the study and GP colleagues who participants perceived to continue to mostly work remotely.

> 'even though the GPs might have been telephoning or video consulting with people, we actually saw, apart from respiratory patients, everybody else face-to-face and carried on with our diabetes, immunisations, cytology, everything as it had been before but with the new PPE'. [GPN8 National].

The need to change the way consultations were delivered to be responsive to patients' requirements was recognized by many and, for some, remote consultation was seen as preferable for patients and acceptable to clinicians. For example, some practices had moved to remote (mainly telephone) consultations or online questionnaires for asthma reviews during the COVID-19 pandemic and, because it had previously been difficult to engage patients in regular in-person reviews, this was continued longer term.

> A lot of people really appreciated not having to come in said, 'I'm never coming in for my asthma review again, I'll do it like this'. I've done asthma reviews of people in stables, on tractors, in the car waiting for children to come out school that kind of thing. So we have not really gone back to seeing many asthmatics face-to-face. [GPN3 National].

However, some participants, were concerned that reviews had become more of a fragmented 'tick box' process than a comprehensive assessment and aspects of reviews were being missed or substituted.

> A lot of things have gone and remained on-line and I've got concerns with some of that, for example, asthma reviews. A lot of it is done through a questionnaire that the patient fills in and sends back. Things such as inhaler technique is sent via a video so the patient can watch it……You can't check the technique. You're missing a lot of nuance of the consultation. I think that's going to backfire personally….you're doing an asthma review and you've not even seen their inhaler technique [ANP4 National]

Some participants used remote methods to limit face-to-face time, while still maintaining holistic, person-centred care.

> I had a nurse who gave a really good example about childhood immunisations. She would have a video call first of all. She would go through, usually with mum, about the vaccines but also she was able to eye-ball mum, child in their own environment and just that building up what nurses in primary care do best—that real holistic approach and….basically a patient would arrive, might be seen in the car park ….given the vaccine and then go. [Nurse Leader 4 National].

This 'blended approach', balancing remote and in-person nursing care, was seen as a way of providing care that both addressed patients' requirements in terms of access, but also allowed flexibility so that care needs could be met appropriately and care delivery could be stratified. However, this was often considered to make little difference to overall exposure, did not improve efficiency, and sometimes complicated consultations. Long-term condition consultations were sometimes split into 'tasks' where healthcare assistants would carry out physical aspects such as venepuncture, measuring blood pressure and carrying out diabetes foot assessments. Registered nurses would then conduct the 'review' part of the consultation via telephone where they would discuss test results, lifestyle advice, review medication and address other patient needs. Here, the blended approach was seen to improve patient uptake and meant care could be prioritized, registered nurse time could be saved, and patients could still be seen in-person if requested.

> before COVID, patients used to come in for a blood test and then a follow-up appointment with the diabetic nurse where they'd have their foot check and everything done. Now they're getting their foot check, blood test, blood pressure and everything done by one of the health care assistants or associate practitioners and then we're looking at the results and then phoning them up with a care plan or seeing them to discuss all the results…. But a lot of people are finding that it's fine over the phone….they're quite happy with that because they've had all their tests done and we're just going over the results with them. [GPN3 Yew Case Site]

5.3.2 | The patient

The complexity of the patient's condition(s) was key in whether participants considered remote working to be safe and effective. There was a shared perspective that remote consultations worked well for people with straightforward problems which could be easily resolved or for people whose long-term issues were well controlled. However, it was considered imperative that participants had the ability to see patients in-person, if needs were considered to be complex and if they had any specific concerns about patients. In this way, skill and expertise of the nurse were considered central to the effectiveness and safety of remote consultations, '*So really the telephone calls are getting rid of the easy ones and making sure they don't turn up to the surgery and the more complicated ones are coming in' [GPN1 National]*.

Some participants felt that specific groups of people, such as older people or those with sensory or learning difficulties, may have more difficulty accessing remote consultations, '*I think there's always that risk of that core group of your elderly, your mental health, learning difficulty patients that might be harder to access' [ANP3 National]*. This included being able to use e-consult (where an online form is completed by the patient and then actioned by a clinician), booking appointments online, accessing links to videos, care plans and other information which is sent remotely, and being able to send data such as photographs to clinicians. As waves of the COVID-19 pandemic progressed and vaccinations and other mitigations become more prominent, it was considered that the personal needs and choices of patients ought to be respected and, as nurses, participants already had the skills to accommodate patients' different consultation needs. Being able to access appointments in non-traditional ways, for example, by booking appointments online, was thought to make the system easier, and more appropriate, for some people, '*They just want to look at their app. So this is about making sure that we've got things that are fit for everybody' [National Nurse Leader 4]*. This could also free up more traditional access for others.

> using these on-line sites frees up the phone system for those patients that can't access their IT technology for whatever reason—they can still phone. So, I feel that's actually benefited those groups that maybe had access issues and now they feel that they can get access easier. [ANP3 National]

5.3.3 | The clinical [therapeutic] relationship

Therapeutic relationships were identified as key to the safety and effectiveness of remote consultations and technology-mediated working. Participants considered that their prior knowledge of patients led to them being able to make sound clinical judgements about their state of health. This was especially important in situations, such as telephone consultations, where participants could not visually assess the patient. Participants also felt that if they already had a rapport with patients, patients would feel more comfortable

talking to them by telephone. However, these advantages were considered to be limited to patients already known to clinicians. Some participants were concerned that they might miss opportunities to pick up on patients concerns, 'doorknob' issues and provide holistic, person-centred care.

> before [the COVID-19 pandemic], they came in for their diabetic review but they might have other things on their mind and because they're actually there face-to-face with you, you can see it in their faces that there's something else on their mind. Whereas on the phone you can't and they might have something else they want to discuss with you but you're [focusing on their] diabetes....I think that's sometimes what you miss. (GPN1 Yew Case Site)

Several participants preferred consulting in-person as they missed in-person contact, felt isolated when conducting remote consultations and perceived they were delivering transactional rather than therapeutic care. Therefore, for some, remote and technology-mediated consultations, and the speed at which they had been implemented without due consideration, had negatively impacted on the patient–nurse relationship. Furthermore, the lack of involvement of nurses in changes to consultation delivery had the potential to destabilize the essence of nursing care.

> I've seen a lot of changes during the pandemic. I'm not happy actually. I'm quite angry as a patient and a nurse about how we weren't consulted in general practice and the art of the consultation and those key core consultations skills I feel are being lost. Now I may be a dinosaur and I'm not against technology, but I do feel that we haven't got the balance right and I think we're losing the essence of nursing care. Yeah, so I think we're at a critical juncture [Nurse Leader 5 National]

However, not all participants agreed that remote and technology-mediated nursing compromised care and some felt that rapport could be developed during remote consultations, *'it's actually quite effective if you can establish that sort of rapport with somebody on the phone' [GPN3 National]*. Study participants thought it was important that practices were flexible and accommodated the range of patient (and nurse) needs moving forward. Furthermore, technology could help redress power imbalances between patients and practices/clinicians. Systems generally focus on patients being directed by the practice, whereas technology can aid patients to organize, and be proactive in, their care.

> [people are] very capable of booking a [beauty appointment] but actually we can't trust patients in booking for a blood test in case they don't come in or they don't see the right clinician. Again it's about using the technology there and it might not be right straightaway but again, this is about education and making it right. [Nurse Leader 4 National]

5.3.4 | The home and family

Digital accessibility was considered to be an issue for some patients who did not have reliable access to online tools to support aspects of some consultations or who lived in areas where broadband was not dependable. This was presented as one reason why telephone consultations were the dominant means of consulting with patients. Issues of digital accessibility, both in the home and due to patient characteristics (see Domain 2) were often mitigated by family and carer support, but remained a barrier to access for those who did not have this support available to them. Not seeing patients in-person was also considered by some participants to potentially negatively impact on safeguarding. Potential missed opportunities, and not being able to assess patients face-to-face or in an environment where they could speak freely, meant that some participants were concerned that this important aspect of their work may be negatively impacted.

> [safeguarding] and safety issues and children not being brought [in]....the biggest problem [was] when health visitors stopped seeing anybody. That was the biggest impact in COVID because, I obviously see loads of children and babies, and that was the biggest problem and I've noticed that many more children are now coded as safeguarding issues.... What are we supposed to look out for as nurses? Elderly abuse that's going to be much harder to uncover if you're only talking to them on the telephone [GPN 3 National]

Linked to this, participants were also concerned there may be a lack of privacy for patients consulting at home and that some people might be prevented from being open in a way they might be in a private consultation room. Some observed that this was exacerbated later in the COVID-19 pandemic, as some participants were aware that the patient was in a public or busy place while the consultation was being conducted as they tried to fit remote consultations around work and family life.

> during the early part of the pandemic....people were at home and they weren't doing anything, even if they were working they were sat at a desk. So you'd ring somebody and they'd pick the phone up straightaway. It worked really well. What we're finding now [is that] people are back at work. Trying to get hold of them. They haven't got a signal or they've turned their phone off because they're in a meeting. So actually those are the things now that don't work quite so

> well. It's the circumstances that have changed. [ANP 7 National]

Moving forward, it was considered necessary that technology and remote consultations be developed in ways which account for, and support, the needs of the community and is fit for the future, '*supporting digital poverty, digital maturity and digital inclusion and make sure that we've got something that is fit for whatever [every] single person needs' [Nurse Leader 4 National].*

5.3.5 | Technologies

Participants were familiar with using information technology to support their work, with electronic records, e-documentation and computer-based templates routinely used in supporting care delivery. Despite this, many participants did not consider themselves to be technologically confident and most did not feel they received adequate training. However, participants generally found many of the technological developments beneficial and embraced them as a tool to support patient care during the COVID-19 pandemic. While they saw technology-mediated and remote working as an adjunct to more traditional in-person nursing care, participants were ready to incorporate aspects they found useful into their future practice. Most considered it had irrevocably changed the way they worked.

> [AccuRx is] a little tool bar at the top of your screen and you can send text messages with a link to send a photo and they click on it and…just follow the instructions. So it's dead easy to use and they've broadened it out by doing questionnaires. [ANP 1 National]

When monitoring patients remotely, or when their care was delegated to less qualified colleagues, the quality and calibration of the patients' equipment and the patient's proficiency, as well as the healthcare professionals' interpretation of these measurements, was particularly important. This meant that additional risk was added to care delivery.

> In terms of the patients doing it correctly, they are given a set of instructions. Whether or not that's always followed, [it] probably won't always happen. Then you've got patients with things like AF [atrial fibrillation] where the machines don't pick up on [it]. It's not gold standard is it? We should be doing it manually ourselves…a health care assistant said, 'I've given this patient a blood pressure machine but it's not working and I've given her another one last week and it still isn't working' but [the HCA had] no idea why that might be and [the patient had] got AF, undiagnosed. So things like will be missed initially, potentially. [ANP 4 National]

Most participants rarely carried out video consultations, despite their relative ease of use. The overload of changes faced by participants during the COVID-19 pandemic may have meant that the relative value of change adoption was prioritized and video consultations potentially did not offer a great enough trade-off.

> We did have access to the video calls but we didn't really use them….we were managing okay with the phone calls. It wasn't as easy as a phone call but it was fairly straightforward and I think we used it a couple of times, but you couldn't see that brilliantly anyway, so you should err on the side of caution. It wasn't that we actively disliked it, we didn't feel like it added a huge amount. [ANP5 National]

5.3.6 | Staff

Remote and technology-mediated working brought about by the COVID-19 pandemic enabled practices to address gaps in clinical staffing in novel ways and provided the means of addressing lack of appropriately qualified and experienced nurses. For example, the Woodlands organization of practices was able to counter nurse shortages in one geographical area by using nurses in another locality to deliver care via remote consultations. Participants skilled in managing a specific long-term condition worked remotely (either from home or from a practice in their own locality) to deliver care to patients in another locality. This was seen as one way in which technology facilitated effective ways of working.

> [I] do remote diabetes….I've got a laptop all set up at home and I just do phone calls to the patients, seeing how they're getting on. Follow-up from their biometric appointments or tasks being set from the GP and looking at medications…. before COVID, patients used to come in [GPN3 Yew Case Site]

While participants in the GenCo study predominantly saw patients in-person, a minority worked from home for at least part of the working week. This provided participants with opportunities to work differently and to their benefit. For example, some participants found it helpful to undertake work such as writing care plans and interpreting investigations at a time and place which suited them, or undertook remote consultations with patients from the clinician's home. Greater flexibility meant that for some participants, their work-life balance improved.

> I got a phone call from school and I had to go and pick one of the kids up and I did my days' work in the evening…I think it makes it better and if you're happier when you're at work, and it works for you, then it's only going to be a benefit for the patients isn't it? [GPN5 National]

However, for some, working from home was felt to be less of an opportunity and more of an incursion on their home life. Some found it was not practicable to work from home as they did not have the privacy to undertake this work or had other commitments, such as young children, at home. Some participants felt pressurized, either by themselves or by employers, to undertake work outside of normal working hours, to work in addition to their contracted hours, or to work from home when ill or isolating with COVID-19.

> You never switch off really and I have sent patients their management plans on their mobile phones at five o'clock on a Sunday evening. You have to be very strict with yourself and on a Sunday night it's very easy to log on to just see what tomorrow holds and then you regret it! [GPN8 National]

Working from home, or in a building with little available support, meant that both formal and informal supervision and support had decreased during the COVID-19 pandemic. In order to ameliorate these concerns, some participants drew on alternative sources of support, '*So you really are on your own at home but…I can look stuff up a lot more easily at home than I can at work….I can have the work computer on and have my computer on for the internet and my emails and I've textbooks as well' [GPN1 National]*. For some, the lack of access to support impacted on the way they nursed, their confidence in their capabilities, tolerance of risk and even the essence of nursing.

> I think [my retirement] was a bit pre-empted by COVID. The role changed drastically with COVID..... The level of risk in my mind seemed to go up a lot because obviously it's different when you can see a patient face-to-face [than] if you're trying to speak to somebody over the telephone. Obviously as a prescribing nurse, I felt that level of risk.....I felt a bit forced into a GP role whilst trying to maintain my nursing integrity, so I did find that hard. I was very good at knowing my limitations, I'm a really experienced nurse. I've worked in primary care for 30 years, so it's not often I ask for help but if I do it's because I need it. But I felt people were so stressed themselves and the workload so great that you felt bad asking people. [ANP6 National]

In addition, participants felt their workload increased through additional technology-mediated ways of patients accessing clinical support. Technology-mediated service provision, such as E-consult (an algorithm-based system where patients complete online forms which are then actioned by clinicians) was considered to create additional workload, particularly for advanced nurse practitioners. This work was not visible and had little or no additional time allocated to managing it. In this way, technology was seen as addressing a political agenda, rather than benefiting patients or being an effective way of working for clinicians, *'how on earth do you prioritise through 600 e-consults? You can't….But it satisfies the agenda doesn't it? Oh look we've made it more accessible. It's only accessible if the other end is able to manage that' [ANP7 National]*. Furthermore, due to the way online data were collected, the additional work of nurses went unrecognized. This is significant because the work of nurses was attributed to other clinicians making it difficult for practices, and local and national bodies, to accurately measure nursing work and plan their workforce accordingly.

> This does impact on general practice nurses. For example, if [a patient] puts a request through for blood pressure medication [and they've] done their blood pressure reading on an NHS app or on a platform and put, "I need to see the GP my blood pressure has gone up". So that is then logged by reception as an appointment request under the GP because [they've] requested the GP. That's then counted in [GP] consultation data but the actual appointment is then shipped out to, who do you think? The nurses! But who's counting the appointment data? So it looks like the nurses aren't doing half as much LTC [long term conditions] because of these apps [Nurse Leader5 National]

5.3.7 | The healthcare organization

Most participants felt that their practice organization had taken the opportunity offered by the COVID-19 pandemic to embrace different ways of working and were keen to keep and develop elements which had worked well. However, there was acknowledgement that longer-term changes were required to meet patients' needs and for general practice to be viable and sustainable. There was also recognition that for sustained change, it is necessary to reflect and take stock. This was challenging when those involved in general practice were experiencing increased demands on their time, '*Every list is chock-a-block, there seems to be no kind of sit and think time in the day….bigger changes will take longer'* [GPN8 National].

Because of the nature of their work, the ANP participants in this study, like their GP colleagues, were reported to be more likely to conduct remote consultations than those in other nursing roles. Consequently, they were more likely to be provided with laptops, webcams and other technology to assist remote working. This *hierarchy of clinician priority* meant that the opportunities for general practice nurses and healthcare assistants to conduct video consultations, or to work from home, were fewer than for their GP and ANP counterparts. This was seen as an extension of traditional healthcare hierarchies where the needs of some clinicians (and consequently patients) took precedence over others.

> the needs of doctors around virtual working were met in terms of training, the support around the total triage model. But actually, I heard nothing from a national level about how we would support nursing. When I was working with nurses….they didn't have the kit, they didn't have cameras to do the e-consultations. They weren't taught how to use that stuff. [Other Manager National]

ANP, GPN and HCA participants, in the main, were not involved in feedback and decision making about what worked well in terms of remote and technology-mediated working and what could be improved in terms of how their work was organized during the COVID-19 pandemic. This was considered to have a negative impact on nursing work, general practices more broadly and ultimately on patient care.

> If we had all been discussing it as a team instead of just doctors and managers, I think we may have given different ideas of how things may have worked….I still think that we should have been included as a whole team….We might have had different ideas or suggested things but I think once they've made their decisions that's it, it's whatever suits them. [Health Care Assistant1 National]

For some participants, it was clear that until space was made, taken, and support given, for nurses to actively contribute to decision-making, nursing would continue to be an afterthought in general practice and their contribution to developing new ways of working missing, '*the biggest learning curve coming into general practice is that you've really got no control…it's their [GPs'] decision basically' [ANP1 National]*. To be able to contribute to practice organizations, structural changes to practice and primary healthcare cultures are necessary.

> we should be at the table for these sort of strategic decisions….Nurses have a real voice and can really add value….But on saying that, they still don't like you to be recognised….it's very rare for a nurse to be offered that sort of type of opportunity. So I still think there's a long way to go. [GPN7 National]

5.3.8 | The wider system

In the initial stages of the COVID-19 pandemic, the government directed primary care to conduct what care it could provide remotely. However, the rapid introduction of remote working meant that implementation was ad hoc and not all technology was fit for purpose. The people who were expected to use the technology were not involved in the design, meaning that there was a lack of understanding about what was actually required for effective working. This stopped participants from using some technology if it was considered unfit for purpose. Furthermore, remote and technology-mediated care delivery was considered by some to be rushed, to be reactive rather than proactive, and lacked evaluation. This led to some participants expressing concern about the risks associated with this way of working.

> the people that bring it in are the people that have designed it and they don't know what general practice is. So they don't really know when you would use it, when it's appropriate. There's a lot of pushing for this on-line GP, but someone has got to sit on the other side of that and make a judgement and it's risky [ANP1 National]

6 | DISCUSSION

This paper reports findings from the GenCo study of the experiences of nurses working in general practice in implementing remote and technology-mediated working at pace and scale during consecutive waves of the COVID-19 pandemic. It highlights how the distinct nature of the work of nurses in general practice during the COVID-19 pandemic intersected with remote and technology-mediated care delivery and working practices. Aligning findings with Greenhalgh et al.'s (2021) PERCS framework has enabled us to systematically identify key areas for consideration to inform how remote and technology-mediated working could be developed to deliver safe and effective nursing care post-pandemic. Findings highlight issues common to participants working in general practice in our study and the specific nature of nursing in general practice to support the development of provision which is fit for the future. Specific areas for consideration are discussed below.

In-person care was often blended with remote and technology-mediated working and such hybrid models have been identified elsewhere (Ashley et al., 2023). This produced unintended consequences, such as increasing workload when digital methods were used in addition to the 'usual' in-person work of participants. It has been estimated that remote working may increase general practice workload by between 3% and 31% (Newbould et al., 2017; Salisbury & Murphy, 2020) and some digital tools paradoxically increase the workload they were designed to reduce (Rosen et al., 2022; Ziebland et al., 2021). At an international level, it remains unclear whether digital solutions substitute for in-person care or create workload duplication (OECD, 2023). In our study, additional nursing workload was often unseen, which can reduce efficiency (Turner et al., 2022) and prevent accurate future workforce planning. Furthermore, while some digital tools worked well, complex and unhelpful remote consultation tool design challenged the effectiveness for participants in our study, as has been noted elsewhere (Ziebland et al., 2021). As a consequence, it is unclear whether, and to what extent, digital solutions will be beneficial to the future provision of nursing care in general practice. This is likely to be context, patient and condition (and nurse/role) specific. Moving forward, it is necessary to prioritize the

areas of nursing practice which would benefit from remote and technology-mediated working, rather than seeking to implement these ways of working across the board.

Our findings indicate that there was a limited benefit to video consultations compared to telephone consultations. This has been reported previously relating to general practitioners, nurses working in general practice and other clinicians (Desborough et al., 2022; Greenhalgh et al., 2022; Halcomb et al., 2023; Murphy et al., 2021). Confidence and training in remote and digital technologies, provision of technological equipment, reason for consultation and complexity of patient needs were all reported as underlying reasons for the preponderance of telephone consultations internationally (James et al., 2021; Greenhalgh et al., 2022; Halcomb et al., 2023; Li et al., 2022; Wanat et al., 2021). Like the nurses in our study, GPs have also reported that video consultations offered minimal *relative advantage* so were not readily adopted (Greenhalgh et al., 2022). This indicates that clinicians are decerning in how, when and where digital technologies would be of most benefit. However, it may be that if more support and training were available, technology may be better utilized to support future care delivery (Cresswell et al., 2011).

The potential risks associated with remote and technology-mediated working were a recurrent theme running through the narratives, and PERCS domains, in our study and risks to patient safety have also been identified elsewhere (Khan et al., 2020; Dixon et al., 2022; Halcomb et al., 2023; Rosen et al., 2022; Wilson et al., 2021). Some experienced nurses in our study were concerned that remote consultations may hinder holism and continuity of care, through delegation and division of care into a series of 'tasks' and the emergence of transactional, rather than therapeutic, relationships. Similarly, experienced GPs have expressed concern about loss of holism, wider contextual knowledge of patients and continuity of care (Rosen et al., 2022) which contributes negatively to patient care (James et al., 2021; Valabhji et al., 2022). It is necessary to plan care delivery in ways which mitigate against such risks and take the time, post-pandemic, to reflect on where remote and technology-enhanced working can best provide safe and effective care.

Participants' lack of involvement in the development, organization and design of remote working was clear in our study and has been identified prior to the COVID-19 pandemic (Barrett & Hatfield, 2015; Cresswell et al., 2011). This resulted in the dissonance between what technology developers thought participants needed from remote consultation tools and what they actually required. This has previously been identified as a barrier to engagement (Cresswell et al., 2011). Consequently, nurse representation is required to inform remote and technology-mediated working policy development and to facilitate sustained changes to care delivery post the COVID-19 pandemic (Wanat et al., 2021).

6.1 | Strengths and limitations

Data collection was delayed due to the ongoing COVID-19 pandemic and we were required to deviate from the original study protocol (Anderson et al., 2022). Consequently, the range and number of participants recruited to the general practice case sites was reduced and it became apparent that we would be unable to gain sufficient depth and breadth of data from this method alone. To counter this, the study design was pragmatically amended to interview a range of participants working in general practice nursing roles across England and nurse leaders working at a national level associated with general practice. This allowed us to identify shared experiences across contexts and gain a broader understanding of the experiences of participants who were nurses working in general practice or at a national level. We acknowledge that experiences of study participants may not be directly applicable to other general practice settings, professional groups or other workforces. However, findings may resonate with similar institutions and workforces and our use of the PERCS framework (Greenhalgh et al., 2021) may enable organizations to recognize challenges and support the general practice nursing workforce going forward. We were able to talk to nurses with a wide range of experience and a variety of roles, but it would have strengthened the study if there had been a more representation of healthcare assistants/nursing associates and if the sample was more representative of participants from diverse backgrounds. The study's focus was on the experiences of nurses, so patients' experiences were not sought.

7 | CONCLUSION

Our study highlights how nurses working in general practice experienced remote and technology-mediated working during consecutive waves of the COVID-19 pandemic. The study not only identified some commonalties with the experiences of GPs but also highlighted specific issues relating to nurses working in general practice. It highlighted what worked well and aspects that require further reflection when planning services and policy design. This requires full attention to ensure the future development of safe and effective nursing care in general practice moving forward.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE): (1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data. (2) drafting the article or revising it critically for important intellectual content.

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No conflict of interest has been declared by the authors.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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