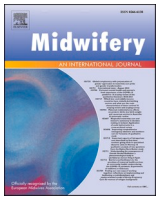
Midwifery 134 (2024) 104016

Contents lists available at ScienceDirect

Midwifery

journal homepage: www.elsevier.com/locate/midw



Midwives' experiences with PPE during the COVID-19 pandemic: The Birth in the Time of COVID (BITTOC) study

Emma C Collins [a,*], Virginia Schmied [a], Sue Kildea [b], Hazel Keedle [a], Melanie Jackson [a], Hannah G Dahlen [a]

[a] Western Sydney University, School of Nursing and Midwifery, Locked Bag 1797, Penrith, NSW 2715, Australia
[b] Molly Wardaguga Research Centre, Charles Darwin university, Ellengowan Drive, Casuarina, NT 0909, Australia

ARTICLE INFO

Keywords:
COVID-19
Personal protective equipment
Midwives
Qualitative research

ABSTRACT

Background: The COVID-19 pandemic resulted in rapid changes aimed at reducing disease transmission in maternity services in Australia. An increase in personal protective equipment (PPE) in the clinical and community setting was a key strategy. There was variation in the type of PPE and when it was to be worn in clincial practice.
Aim: This paper reports on Australian midwives' experiences of PPE during the pandemic.
Methods: This sequential mixed methods study was part of the Birth in the Time of COVID-19 (BITTOC 2020) study. Data were obtained from in-depth semi-structured interviews with midwives in 2020 followed by a national survey undertaken at two time points (2020 and 2021). Qualitative open-text survey responses and interview data were analysed using content analysis.
Findings: 16 midwives were interviewed and 687 midwives provided survey responses (2020 n = 477, 2021 n = 210). Whilst midwives largley understood the need for increased PPE, and were mainly happy with this, as it was protective, they reported a number of concerns. These included: inconsistency with PPE type, use, availability, quality, fit and policy; the impact of PPE on the physical and psychological comfort of midwives; and the barriers PPE use placed on communication and woman centred care. This at times resulted in midwives working outside of policy.
Conclusion: These findings highlight the need for future comprehensive pandemic preparedness that ensures policy and procedure recommendations are consistent and PPE is available, of approriate quality, and individually fitted in order to ensure that Australian maternity services are well placed to manage future pandemics.

Statement of significance

Problem

There is limited evidence regarding the impacts of PPE use on Australian midwives during the COVID-19 pandemic.

What is Already Known

The emergence of the COVID-19 pandemic impacted maternity practice in Australia with the use of PPE being a key strategy to reduce transmission in maternity services.

What this paper adds

Midwives identified that the increased use of PPE was necessary though problematic during the pandemic. They described the limitations of PPE availability, quality, fit and the negative impacts on communication and woman centred care. This paper highlights the need for senior midwifery representation at state and territory level with clear policy and preparedness in anticipation of future pandemics.

Background

During November 2019, the newly emerging novel coronavirus, SARS-CoV-2, spread rapidly across the world, resulting in the

* Corresponding author.
E-mail address: 19073792@student.westernsydney.edu.au (E.C. Collins).

https://doi.org/10.1016/j.midw.2024.104016
Received 9 January 2024; Received in revised form 18 April 2024; Accepted 22 April 2024
Available online 23 April 2024

declaration of a global pandemic in March 2020 (World Health Organization 2020). With over 773 million cases and nearly 7 million deaths as of January 2024, the COVID-19 pandemic crippled health care services and economies alike (Chowdhury et al., 2021; World Health Organization 2023). In an attempt to curb the outbreak, affected countries introduced suppression strategies, including closed borders, lockdown measures, social distancing and vaccination (Comfort et al., 2020; Wilson et al., 2021). Throughout the pandemic, frontline health care workers were at increased risk of COVID-19, with the World Health Organization estimating that conservatively, at least 115,000 health care workers lost their lives as a result of COVID-19 exposure (World Health Organization 2021). In the early months of the outbreak, nosocomial health care provider exposure to SARS-CoV-2 occurred in part due to a lack of personal protective equipment (PPE) (Sun et al., 2020; J. Wang et al., 2020). PPE such as masks, gloves, gowns, visors and shields were vital in the protection of health care workers and their patients (Thompson et al., 2021; Chu et al., 2020).

There has been much debate in the scientific community regarding the primary mode of transmission for COVID-19, with close contact via respiratory droplets and airborne transmission via respiratory aerosols both considered dominant infective routes (Morawska and Milton, 2020; Zhang et al., 2020; Li et al., 2020). The use of PPE has been promoted for health care worker safety, with physical distancing, face masks, eye protection and respirators offering an increased level of protection (Thompson et al., 2021; Chu et al., 2020). Where face masks are utilised by both patients and healthcare workers, there is a reduced likelihood of SARS-CoV-2 infection (X. Wang et al., 2020).

Within the maternity environment, midwives work closely with the women they care for, with rapport, trust and connection viewed as instrumental to being 'with woman' (Bradfield et al., 2019). The emergence of the coronavirus and the subsequent requirement for social distancing and PPE use, whilst protective, has not been without an impact on women and midwives (Bradfield et al., 2021). Federal and state governments together with professional/regulatory bodies such as the Australian Nursing and Midwifery Federation, the Nursing and Midwifery Board of Australia and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists issued practice advice regarding the effective use of PPE for maternity healthcare workers in managing the spread of COVID-19 (X. Australian Nursing and Midwifery Federation 2020; Victorian Government 2022; Royal Australian and New Zealand College of Obstetricians and Gynaecologists 2020; Nursing and Midwifery Board Australia 2020). This guidance however, lacked consistency (X. Australian Nursing and Midwifery Federation 2020). PPE accessibility was a concern for some with an Australian Nursing and Midwifery Federation submission to the senate select committee on COVID-19 noting that some healthcare workers reported a lack of available PPE, reuse of single-use equipment, sub-standard PPE and inadequate training in its use (X. Australian Nursing and Midwifery Federation 2020). Furthermore, privately practising midwives (PPM's) reported being denied access to PPE through affiliate hospitals with 65 % percent reporting early in the pandemic that they needed to source masks through local hardware stores or handmake cloth masks (Homer et al., 2021).

Whilst there is strong evidence to support the use of PPE in the fight against COVID-19 (Ferrari et al., 2021; Leeds, 2021; Verbeek et al., 2019; Woolley et al., 2020), the experiences of midwives as they relate to PPE use are not well understood. The aim of this study was to examine the experiences of Australia midwives who used PPE during the COVID-19 pandemic.

Methods

Study design

The Birth in the Time of COVID-19 (BITTOC) study explored the experience of women, midwives and student midwives involved in maternity care during the COVID-19 pandemic. The BITTOC study was a sequential mixed methods study (Creswell, 2008) that critically analysed COVID-19 related changes to maternity services within the Australian context (Fig. 1). One of the research questions within the BITTOC study was to examine the impact that PPE had on midwives. Ethics approval for the study was granted through the Western Sydney University Human Research Ethics Committee (H1385) and Charles Darwin University (H21052).

The dataset for this paper was extracted from the midwives' interviews (Table 1) and open-text survey responses at both timepoints (Table 2).

Data collection

In-depth interviews were undertaken by two researchers (HD, MJ), with 16 Australian midwives between May and August 2020. Open ended interview questions were developed to provide an opportunity for midwives to discuss COVID-19 topics that they deemed important. We aimed for 10–20 interviews, and after 16 interviews no new data emerged, so data collection was ceased at that point. Inclusion criteria for the midwives were: being a registered midwife providing maternity care after March 2020 and working within public or private maternity systems. Interviews were conducted and recorded online with the participant's consent. Participants were asked a series of open-ended questions including questions relating to PPE (Table 1). These interviews informed the development of the national BITTOC surveys for midwives conducted in 2020 and 2021 which included open text PPE questions (Table 2). The surveys were piloted with the midwives who participated in the in-depth interviews and changes were then made to the survey and distributed widely through social media channels (Facebook, Instagram and Twitter) and the professional body for midwives – the Australian College of Midwives. The survey was kept open, and reminders were sent to maximise participant numbers. The survey was closed when very few further responses were received. Each survey took 30–40 min to complete. In total 477 midwives responded to the 2020 survey and 210 responded to the 2021 survey. See Supplementary Tables 1&2 for participants demographics. The survey had Likert scale questions and open-ended questions. This paper analysed the open-ended questions.

Data analysis

Data were analysed through content analysis. This involved the systematic categorisation of word and theme frequency within the data, as interpreted by the researchers (Hsieh and Shannon, 2005; Schreier et al., 2020). Schreier described content analysis as a five step process including the development of a research question, the formation of an initial coding frame, testing and revision of the initial coding frame, coding of all collected data and finally, synthesis and presentation of findings (Schreier et al., 2020). The initial coding frame was created through reading and familiarisation of the interview transcripts. Analysis of the open-text survey responses tested and then refined the coding frame. Codes were counted and the major categories within both datasets were identified. Categories and sub-categories were developed from the coded data and agreed upon by the research team. Where analysed data had relevance to more than one code, it was coded into multiple categories. Coding was conducted by the primary reviewer (EC) and examined by a second reviewer (HD) in order to promote reliability. Quotes that did not relate to PPE were excluded from the analysis. There were 57 unrelated quotes in the 2020 survey and 15 unrelated quotes in the 2021 survey. The primary reviewer (EC) was not involved in the development of study protocols, which improved rigour of the analysis. Coding occurred through the use of NVIVO (QSR International Pty Ltd 2020) and excel spreadsheets.

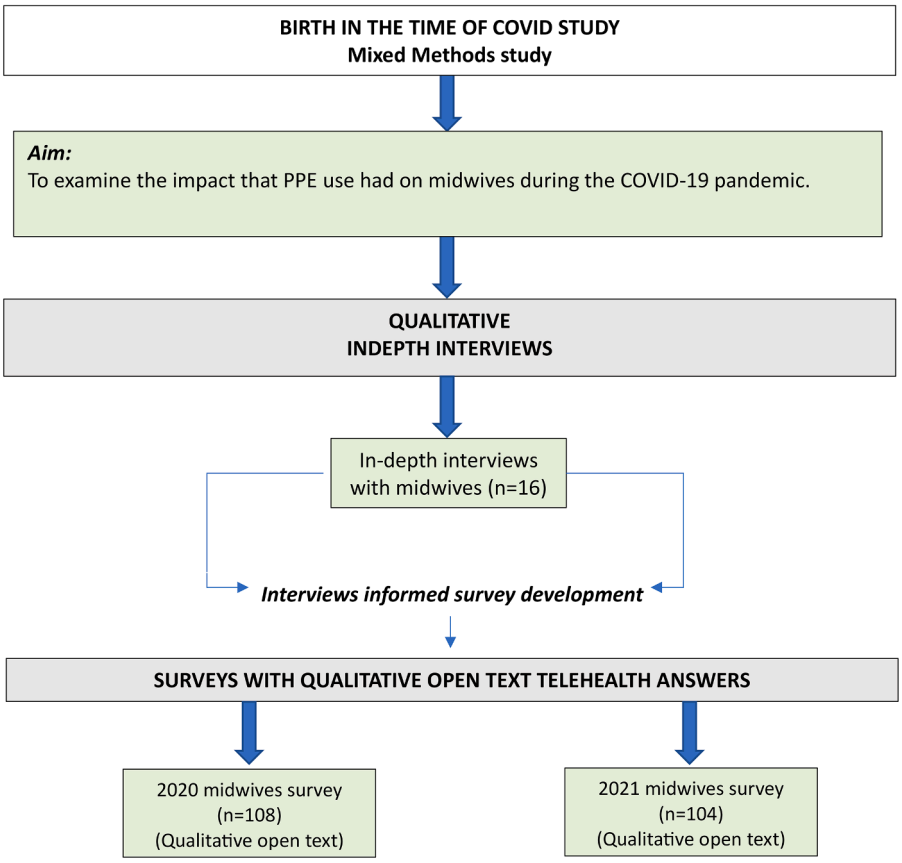


Fig. 1. Study design.

Table 1
A sample of the open-text interview questions relating to PPE.

Interview question (open-ended)
What PPE did you have to wear routinely?
What is it like to work as a midwife during the Covid-19 pandemic?
What were the biggest challenges you faced during this time?
What measures have been in place to keep you safe in the workplace?
Was there a desire amongst staff to wear PPE?
Did you feel the need for PPE and the changes to PPE use were well communicated?
What changed for your workplace during COVID-19?
Are you using the same PPE that you use in the hospital when you visit women at home?

Table 2
Survey open-text questions.

No.	**Survey question (open-ended)**
Q 6.1_11	At the height of the pandemic, what were the changes to the rules in your facility about the use of PPE when providing antenatal care to women not suspected of having COVID-19?
Q 6.2	Would you like to provide any more information on PPE and antenatal care?
Q 7.1_17	At the height of the pandemic, what were the changes to the rules in your facility about the use of PPE when providing in hospital labour and birth care to women who were not suspected of having COVID-19?
Q 7.2	Would you like to provide any more information on PPE and labour and birth care?
Q 8.1_11	At the height of the pandemic, what were the changes to rules in your facility about the use of PPE when providing in hospital postnatal care to women who were not suspected of having COVID-19?
Q 8.2	Would you like to provide any more information on PPE and postnatal care?
Q 9.1_13	If you provide care in the community to women who are not suspected of having COVID-19, what PPE precautions were you using (at the height of the pandemic) in addition to what you normally do?
Q 9.2	Is there anything else you would like to tell us about PPE precautions when working in the community?
Q10.2_8	What positives do you perceive to wearing a mask whilst working?
Q 10.3	What negatives who you perceive to wearing a mask whilst working?
Q 10.4	Are there any other comments you would like to make about wearing a mask?
Q 10.5	What is your opinion about the use of PPE whilst providing midwifery care to women in your personal work context?
Q 11.1_10	What have you been doing to change how you communicate with women when you are wearing a mask?
Q 14.3	Can you describe the changes to PPE when caring for a woman having a waterbirth
Q 25.2	If you have been wearing PPE, please describe your PPE use: (relating to Privately Practising Midwives)

Reflexivity

Reflexivity, requires researchers to acknowledge and critically consider their own positions, experiences and beliefs in each stage of the research process and is an essential component of qualitative research (Liamputtong, 2020). All five researchers are midwives, with two working clinically during the pandemic. Three academic researchers involved in this study have experience in qualitative and mixed methods research. A reflexive journal was maintained by the first author and weekly team meetings were held during the research process to discuss categories and sub-categories so as to ensure research integrity and credibility.

Findings

Demographics for the midwives are in Supplementary tables (1–2)

All 16 interviewed midwives discussed PPE and the responses were coded. A total of 827 PPE related comments were coded from the surveys (466 open text comments from the 2020 survey and 361 open-text comments from the 2021 survey). From the coding frame there were three categories and three sub-categories identified with the frequency of PPE quotes in both number and percentage presented in Table 3.

Category: the shifting landscape of PPE during a pandemic

The largest category was 'the shifting landscape of PPE during a pandemic' with 100 % of interviewed midwives, 93 % of open-text comments in the 2020 survey and 86 % of 2021 open-text comments discussing inconsistency in PPE type, use and availability, inconsistency in policy, and inconsistency in PPE quality and fit.

Inconsistency in policy

Ten of the interviewed midwives discussed changeable and confusing policy in relation to PPE, with this sub-category accounting for 11 % of open text comments in the 2020 survey and 12 % in the 2021 survey.

During 2020, midwives identified instances of reactive, changeable or confusing policies and procedures relating to PPE use. Information was at times inconsistent, conflicting and ad-hoc. Policy changed rapidly as the COVID-19 situation evolved, however there was often confusion when changes to processes, such as what PPE use was required in different scenarios, were implemented. Midwives reported frustration at the lack of consistency in these changes.

"Oh my God. One shift it changed three times on what we were meant to do, and what PPE, and what situation" (MW 5, 2020)

PPE requirements were viewed by some midwives as excessive and detrimental to care provision. Midwives described circumstances where limited PPE supply resulted in an inability to meet policy requirements which left them feeling exposed and at times unsafe. During 2021 there were continuing changes to PPE requirements due to changes in COVID-19 strain.

"Inconsistent advice. Changing rules daily during the height of pandemic. But quick action from workplace implementing rules is a positive" (Q 10.5, 2020)

Inconsistency in PPE type, use, availability

All interviewed midwives discussed inconsistency in PPE type, use and availability. This sub-category accounted for 75 % of open text comments in the 2020 survey and 69 % in the 2021 survey. Generally, PPE was implemented in most services at some stage during the pandemic in 2020, though its type, use and availability was not consistent. PPE use increased in 2021.

Masks were the most common form of PPE used in 2020, though midwives reported that implementation was inconsistent. Some midwives reported the requirement to wear full PPE (gloves, masks and gowns) during 2020, whilst others reported no PPE use and limited availability. A number of services limited masks and other PPE use to situations where staff were required to screen visitors coming in for hospital care or for COVID suspected or COVID positive women.

"At height of pandemic March/April 2020 no additional PPE. With later community transmission face masks required within 1.5 m women/babies/families" (Q 6.2, 2020)

"We had to wear full gown, goggles and masks for the whole shift, changing gowns every two hours" (Q 6.2, 2020)

There was also diversity in the instruction given to staff regarding the frequency of mask changing. Some services had midwives changing their masks every two to four hours whilst others were in the same mask for the duration of the shift.

"….just that you use the same one all day is laughable" (Q 10.4, 2020)

An increase in PPE use occurred during 2021 with an upsurge in community transmission of the COVID-19 Omicron variant. PPE requirements generally extended to a full shift rather than for components of care, as was the case in 2020. PPE included masks, face shields, visors, goggles, gowns, aprons, gloves and boots. Hand sanitising and social distancing were implemented in most services.

"Requirements changed from surgical mask only during 'covid normal', to surgical mask + goggles or face shield during covid active and peak, and finally in about August/Sep it changed to fit-tested N95 + face shield or goggles" (Q 6.2, 2021)

Whilst many midwives had full access to PPE, midwives in both surveys reported that access and availability of suitable PPE was a concern, and in some instances considered dangerous. Some midwives reported mask shortages and a small number of midwives, mostly privately practising midwives (PPMs), needed to reuse masks, wear

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

Category	Sub category	Midwife interviews 2020 ($n = 16$)	Midwife open text responses 2020 ($n = 466$)	Midwife open text responses 2021 ($n = 361$)
The shifting landscape of PPE during a pandemic	Inconsistency of PPE type, use, availability	All 16 interviewed midwives discussed PPE use and type, with 9/16 midwives discussing PPE availability	344 (74 %)	248 (69 %)
	Inconsistency in policy	10/16 midwives discussed changeable or confusing policy regarding PPE use	51(11 %)	42 (12 %)
	Inconsistency in quality and fit	7/16 midwives discussed PPE quality and fit	37 (8 %)	22 (6 %)
Uncomfortable but necessary (Detrimental to the physical and psychological health of midwives)		8/16 midwives discussed physical discomfort relating to PPE use 7/16 midwives discussed anxiety and stress related to PPE use	95 (20 %)	91 (25 %)
Barrier to being 'with woman' (PPE a barrier to communication, rapport and relationship)		8/16 midwives discussed impacts on care provision relating to communication, rapport and relationship	98 (21 %)	73 (20 %)

handmade aprons rather than disposable gowns or source their own PPE.

"…..but of course, we had a huge shortage….Now, you can see what a problem that could be potentially if you're reusing the same mask over and over" (MW 9, 2020)

"….it was not consistent, often locked away, rationed, suggested to be reused… it was dangerous" (Q10.5, 2020)

" Well, it was hard at the height of the pandemic, as I couldn't access enough PPE. Despite many requests to the National Stock, we were declined PPE." [Privately practising midwife] (Q 25.2, 2020).

Where midwives experienced difficulties accessing quality PPE, they voiced frustration and concern for their safety. In some instances, medical staff were given access to better quality face masks and shields despite midwives having closer contact with women for a longer period of time.

"Doctors were definitely wearing PPE when we were told, 'No. You're not allowed to' (MW 5, 2020)

The changes to PPE use within hospitals during the 2021 period also occurred in the community setting with midwives reporting the requirement to wear full PPE in women's homes. Midwives generally described a replication of hospital PPE use whilst in a woman's home though some noted that they were led by the women they cared for in regards to PPE use. Those midwives who were required to utilise gloves and gowns in the home setting found donning and doffing at a woman's front door impractical.

"I work in the Community. We had to use PPE at the height of the pandemic. Donning and doffing PPE from the boot of a car in the Community was difficult - wind and rain affected the gowns billowing around and touching other surfaces" (Q 9.2, 2020).

PPE was broadly viewed by midwives as a welcome inclusion in the management of COVID transmission, though some midwives did not consider its use necessary, or evidence based. Midwives spoke of their desire to provide care unimpaired by the inclusion of PPE and as a result some midwives would remove PPE when they were behind closed doors with women and unobserved.

"PPE use needs to be evidence based and also at the discretion of the people who are interacting" (Q 10, 2021)

"I'm grateful for the protection it provides me and the people receiving care from me, and I'm aware of the privilege of being able to access PPE when many others around the world can't" (Q10., 2021)

Inconsistency in PPE quality and fit

Almost half of the interviewed midwives (7 from 16) discussed inconsistency in PPE quality and fit. This sub-category accounted for 8 % of open text comments in the 2020 survey and 6 % in the 2021 survey. Midwives questioned the effectiveness of surgical masks within the context of a pandemic. Fit testing of masks was rarely discussed in 2020, however midwives completing the 2021 survey reported limitations and diversity in access to mask fit testing which negatively impacted upon the appropriateness of PPE. Limited access to fit testing led to midwives caring for women with ill-fitting masks that gaped on the face.

"The surgical masks we were wearing gaped at the sides unless you modified them. Don't think they would of been effective for us with the close proximity to women…." (Q 10.4, 2020)

"It was difficult initially to book in for fit testing in 2020, and now, over 12 months later, we have been told that best practise is to be repeat tested every 12 months, but there is no capacity to book in for further fit testing currently" (Q 6.2, 2021)

Category: uncomfortable but necessary

The second largest category related to PPE being uncomfortable but necessary, with 15 (94 %) of the midwives interviewed, 20 % of open text comments in the 2020 survey and 25 % of 2021 open text comments discussing the physical and/or psychological impact of PPE use. In this category midwives identified that PPE was detrimental to the physical and psychological health of midwives.

Whilst midwives generally recognised the need for PPE use, they nonetheless disliked the associated physical and psychological impacts. Midwives noted PPE discomfort in 2020, though this increased in 2021 with the broader introduction of N95 masks, and full PPE. Commonly midwives complained of discomfort, facial pain, swelling, headache, claustrophobia, a sore face and skin irritation, overheating, anxiety, increased fatigue and dehydration. Once in full PPE, midwives were unable to easily access bathrooms and ensure adequate fluid intake. This discomfort was exacerbated by the aforementioned limitations to fit testing for midwives.

"We were not fit tested and had to wear masks that caused significant distress for staff due to pain on the nose, swelling of the nose, skin break down (blisters, open skin, scarring which is not permanent), significant headaches, dry mouth and throat, feeling woozy, unable to communicate properly, dehydration. We were told this was to reduce staff furlough and there has been no acknowledgement that these masks were not meant for long term use. We are unable to have a drink in 3–4 h as supply is short and we have to be preserving stock. Most of us are distressed" (Q 6.2, 2021).

In maternity services where there was confusion about PPE use, availability or quality, some midwives reported feeling unsafe and at risk which in turn resulted in feelings of stress and anxiety.

"…. we were not allowed to wear these (N95 masks) despite high rates of staff transmission in the hospital…" (Q 6.2, 2020)

Category: barrier to being 'with woman'

The final category was 'barrier to being with women' with half of midwives who were interviewed, 21 % of 2020 and 20 % of 2021 open text comments identifying that PPE impacted negatively upon care provision in the areas of communication, rapport and relationship. The use of masks, goggles and shields interfered with effective verbal communication with masks in particular muffling voices and making it hard to hear, leading to miscommunication. The limitations that PPE bought to communication impacted heavily on rapport and relationship development. Many midwives considered masks impersonal and that they made them feel less approachable and less able to connect with women. PPE use also proved problematic during emergencies where clear and concise communication is vital.

"It is a barrier to building rapport and medicalises/makes clinical what is supposed to be a normal, healthy process" (Q10.5, 2021)

"Obstructs communication due to muffling sounds, lack of expression, depersonalize contact" (Q 10.4, 2020)

Midwives viewed non-verbal communication as an essential midwifery tool that was significantly interrupted by PPE use. This created significant issues when caring for women from non-English speaking backgrounds, or those with a hearing impairment. The limitations on non-verbal communication skills such as facial expression and body language resulted in communication challenges which negatively impacted both midwives and women.

"The masks are more of a hindrance than anything and they really affect the care provided to women. They especially impact women who rely on lip reading for communication, and also women whose first language isn't English" (Q10.4, 2020)

Some midwives reported circumnavigating PPE requirements when they considered connection with the woman as crucial. This occurred during the active stage of labour, after pregnancy loss and postnatally where midwives viewed being 'with woman' as necessary.

"….she and her husband were both devastated [loss of baby]….I got in and I hugged both of them….I didn't go into midwifery to say I'm terribly sorry behind a mask" (MW 1, 2020).

Midwives were creative and resourceful in attempting to improve communication, rapport and relationship when PPE was a barrier. Solutions such as wearing pictures of themselves smiling and mask free, and writing their name and role on their mask, assisted women to recognise the midwife. Speaking loudly, clearly and slowly aided the transfer of information. Sitting further away from hearing impaired women and removing the mask so she could lip read limited miscommunication and generally using gesticulation, sitting at the same level as

women was also beneficial.

"I wear a badge with me smiling and mask free" (Q 11.1_10, 2020)

Discussion

The requirement for increased PPE use during the COVID-19 pandemic impacted midwives working within Australian maternity systems. In particular face-to-face care delivery and physical comfort were affected. Midwives in this study predominantly viewed PPE as both necessary and problematic, moving between these concepts in the interviews/comments analysed. Midwives struggled with the impacts of mask use, but also the knowledge that PPE was protective. Midwives identified the impact of PPE use on rapport development with women which is consistent with findings from other studies, and other professionals (emergency service workers, dentists, and nurses) where PPE use has been found to have a negative impact on communication, interpretation and recognition, increasing fear and a sense of isolation for those receiving care (Ferrari et al., 2021; Aengst et al., 2022; Legge et al., 2023; Holm and Dreyer, 2023). Furthermore, these studies identified that PPE use disrupted effective clinical communication, a particular concern during emergencies (Aengst et al., 2022; Holm and Dreyer, 2023)

Australian midwives reported inconsistency in PPE use, type and availability; particularly an overall lack of preparedness by the health system in relation to supply and use during the pandemic. Confusing and changeable policies, particularly in the early days of the pandemic, caused distress and lack of confidence in those leading the pandemic response. Other authors have reported inconsistency with PPE quality and fit, and concerns related to PPE availability and effectiveness (Ferrari et al., 2021; Hoernke et al., 2021; Wittenberg et al., 2021; Ong et al., 2021; Kea et al., 2021; Ayton et al., 2022). Furthermore, the concerns of Australian midwives in relation to PPE availability were shared by health care professionals in international studies which identified that single use PPE was frequently re-used as a result of shortages which caused anxiety (Kea et al., 2021; Wild et al., 2022). The impacts of physical and mental discomfort on an already fatigued workforce who are understaffed and poorly remunerated cannot be underestimated. Experiencing altered communication with women and other staff, physical barriers and discomfort, as well as concerns related to PPE availability and effectiveness have all impacted on staff during the pandemic (Ferrari et al., 2021; Hoernke et al., 2021; Ong et al., 2021; Kea et al., 2021; Çiriş Yildiz et al., 2022). In our findings, only two areas showed a significant difference between 2020 and 2021. Inconsistency in PPE type, use and availability was reported as slightly less of a problem in 2021. Also, midwives reported more PPE discomfort in 2021 as compared to 2020, possibly due to the increased requirements for PPE fit testing and N95+ masks, face shields and goggles.

It is important that lessons are learned from the COVID-19 pandemic and improvements are made to emergency preparedness plans, stockpiles, transport, communication, fit testing, safety etc. Future research should explore how we can reduce or remove the barrier midwives feel PPE puts between them and women to make sure midwives and women stay safe during times such as the COVID-19 pandemic. In some instances, midwives reported inequitable policy with medical staff having greater access to PPE, thereby highlighting the need for a balanced approach to PPE availability and use. Privately practising midwives (PPM's) were all but forgotten when it came to PPE. A previous study supports this finding, identifying that PPM's were unable to obtain PPE from the National Emergency stockpile, resorting to making masks, aprons and even hand sanitiser in Australia (Homer et al., 2021). Consistency across health services is key and lessons from the COVID-19 pandemic should be heeded and approaches improved, with single clear messaging and equitable access to appropriate PPE for all health workers, including early access to national PPE stockpiles for PPM's. The lack of awareness of the requirements of PPM's reflects an invisibility of this group of health providers in society as a whole and may also have been impacted by a lack of senior midwifery expertise in state and commonwealth policy offices with many of our Chief Nursing and Midwifery advisors not actually holding midwifery qualifications, expertise and skills (Dahlen et al., 2020; Australian Midwifery and Maternity Alliance 2022). The lack of a strong midwifery voice is a safety and quality issue that has been identified many times with calls from midwives across the nation to have Chief Midwives who are midwives in every jurisdiction.

Limitations

This paper looks at PPE from midwives' perspectives only and it may have been beneficial to explore the views of women and other health care providers as well. Midwives with a more negative assessment of the pandemic may have been more likely to respond to the call for interview or respond to the surveys. There is also a larger number of responses coming from midwives working in NSW, Victoria and Queensland where COVID 19, PPE requirements and lockdowns were most extreme. Therefore, these findings may be less relevant to midwives working in other States and Territories who were less affected. The survey was advertised in both years (2020 and 2021) and while some midwives may have answered in both years, we think most were different. As the survey was anonymized to ensure confidentiality, there was no way to determine the number of individuals who participated in both the first and second survey. The benefits of this study included the building of two national surveys in 2020 and 2021 from in-depth interviews with midwives, enabling capture of issues midwives identified as most relevant, including PPE. Undertaking the survey twice over two consecutive years when the pandemic was most intense enabled a look at how some concerns changed over time and some issues were resolved or adjusted to.

This study provides some important lessons for pandemic preparedness. In particular health advice needs to have a cohesive and consistent approach when it comes to pandemic management with a clear communication strategy put in place. It is important to recognise the impact that constant, high level wearing of PPE had on midwives and explore further the contribution to burn out, retention and fatigue resulting from the pandemic.

Conclusions

This is one of the largest studies in Australia into the experiences of midwives with PPE during the pandemic. While midwives recognise the importance of PPE in reducing infection rates, PPE use during a pandemic impacted on care, interpersonal relationships, and personal comfort. In the first year of the pandemic (2020) changing and inconsistent policies and guidelines regarding PPE use, and accessbility of PPE by PPMs had a negative impact on some midwives. The second year of the pandemic (2021) showed some improvement in availability of PPE, as well as an increase in discomfort as a result of increased PPE requirements and use. These findings highlight the need for future comprehensive pandemic preparedness that ensure policies and practice recommendations are consistent and that services ensure that PPE is available, of approriate quality, and is individually fitted in order to ensure that Australian maternity services are well placed to manage future pandemics.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Acknowledgements

The article entitled 'Midwives' experiences with PPE during the

COVID-19 pandemic: The Birth in the Time of COVID (BITTOC) study' is the original work of the authors.

The article has not received prior publication and is not under consideration for publication elsewhere.

All authors have seen and approved the manuscript being submitted.

The authors abide by the copyright terms and conditions of Elsevier and the Australian College of Midwives.

Author contributions

EC conducted the data analysis, Writing – original draft, Writing – review and editing. VS, HK and SK were involved in paper review and editing. MJ conducted data analysis and paper review and editing. HD was involved in Conceptualisation, Methodology, Validation, Resources, Data curation, Writing, Review and Editing, Supervision and Project Administration

Ethical statements

Ethics approval for the study was granted through the Western Sydney University Human Research Ethics Committee (H1385) and Charles Darwin University (H21052).

Funding

This research was supported by Sydney Partnership for Health, Education, Research and Enterprise (SPHERE) – Maternal, Newborn and Women's Clinical Academic Group (MNW CAG to Hannah Grace Dahlen), Western Sydney University and the Charles Darwin University Rainmaker Readiness Grant (Pregnant During the Pandemic, Grant ID: 3377286) awarded to S.K. (Sue Kildea) and B.L., (Belinda Lequertier), the Canadian Institutes of Health Research (CIHR # PJT-148903) awarded to S.K. (Suzanne King) and colleagues and Michael Smith Foundation for Health Research (RT-2020–0453 CIHR F19–04572) awarded to M.A.M. Funders had no involvement in the research.

Acknowledgements

The authors acknowledge and thank the midwives' who participated in this study for their willingness to share their personal and professional experiences of PPE use during the pandemic.

Data statement

Due to the sensitive nature of participant interviews and in keeping with participant confidentiality requirements under the ethics approval, participant transcripts are confidential.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2024.104016.

References

World Health Organization. WHO announces COVID-19 outbreak a pandemic. 2020 17/04/2023]; Available from: https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic.

Chowdhury, E.K., Khan, I.I., Dhar, B.K., 2021. Catastrophic impact of Covid-19 on the global stock markets and economic activities. Bus. Soc. Rev.

World Health Organization, WHO Coronavirus (Covid 19) dashboard. 2023.

Comfort, L.K., et al., 2020. Crisis decision-making on a global scale: transition from cognition to collective action under threat of COVID-19. Public Adm. Rev. 80 (4), 616–622.

Wilson, A.N., et al., 2021. Caring for the carers: ensuring the provision of quality maternity care during a global pandemic. Women Birth 34 (3), 206–209.

World Health Organization. Director-General's opening remarks at the World Health Assembly—24 May 2021. 2021; Available from: https://www.who.int/director-general/speeches/detail/director-general-s-opening-remarks-at-the-world-health-assembly—24-may-2021.

Sun, H., et al., 2020. Nosocomial SARS-CoV-2 infection among nurses in Wuhan at a single centre. J. Infect. 80 (6), e41–e42.

Wang, J., Zhou, M., Liu, F., 2020a. Reasons for healthcare workers becoming infected with novel coronavirus disease 2019 (COVID-19) in China. J. Hosp. Infect. 105 (1), 100–101.

Thompson, E.R., et al., 2021. Universal Masking to Control Healthcare-Associated Transmission of SARS-CoV-2. Cambridge University Press, Cambridge, United Kingdom, pp. 1–24.

Chu, D.K., et al., 2020. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet North Am. Ed. 395 (10242), 1973–1987.

Morawska, L., Milton, D.K., 2020. It is time to address airborne transmission of coronavirus disease 2019 (COVID-19). Clin. Infect. Dis. 71 (9), 2311–2313.

Zhang, R., et al., 2020. Identifying Airborne Transmission As the Dominant Route For the Spread of COVID-19, 117. Proceedings of the National Academy of Sciences of the United States of America, pp. 14857–14863.

Li, Y., et al., 2020. Understanding transmission and intervention for the COVID-19 pandemic in the United States. Sci. Total Environ. 748, 141560.

Wang, X., et al., 2020b. Association between universal masking in a health care system and SARS-CoV-2 positivity among health care workers. J. Am. Med. Assoc. 324 (7), 703–704.

Bradfield, Z., et al., 2019. It's what midwifery is all about": western Australian midwives' experiences of being 'with woman' during labour and birth in the known midwife model. BMC Pregnancy Childbirth 19 (1), 29.

Bradfield, Z., et al., 2021. Midwives' experiences of providing maternity care during the COVID-19 pandemic in Australia. Women Birth.

Australian Nursing & Midwifery Federation. Personal Protective Equipment (PPE). 2020; Available from: https://www.anmf.org.au/media/5ase3day/ps_personal_protective_equipment_ppe.pdf.

Victorian Government, Department of Health and Human Services Victoria | Personal Protective Equipment (PPE) - coronavirus (COVID-19). 2022.

Royal Australian and New Zealand College of Obstetricians and Gynaecologists, RANZCOG - COVID-19: protection of midwives and doctors in the birth unit. 2020.

Nursing and Midwifery Board Australia. COVID-19 guidance for nurses and midwives. 2020; Available from: https://www.nursingmidwiferyboard.gov.au/Codes-Guidelines-Statements/COVID19-guidance.aspx.

Australian Nursing & Midwifery Federation, Submission to the senate select committee on Covid-19. 2020.

Homer, C.S.E., et al., 2021. The impact of planning for COVID-19 on private practising midwives in Australia. Women Birth 34 (1), e32–e37.

Ferrari, G., et al., 2021. The impact of personal protective equipment and social distancing on communication and relation between nurses, caregivers and children: a descriptive qualitative study in a maternal and child health hospital. J. Clin. Nurs.

Leeds, C., 2021. COVID 19: health care workers, risks, protection and transmission. Lancet Reg. Health Europe 1, 100022.

Verbeek, J.H., et al., 2019. Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. Cochrane Database Syst. Rev. 7, CD011621.

Woolley, K., Smith, R., Arumugam, S., 2020. Personal Protective Equipment (PPE) Guidelines, adaptations and lessons during the COVID-19 pandemic. Ethics, Med. Public Health 14, 100546.

Creswell, J., 2008. Research Design: Qulitative, Quantitative and Mixed Methods Approaches. Sage UK, London.

Hsieh, H.-F., Shannon, S.E., 2005. Three approaches to qualitative content analysis. Qual. Health Res. 15 (9), 1277–1288.

Schreier, M., et al., 2020. Content analysis, Qualitative. Social media analysisSAGE Publications Ltd, London.

QSR International Pty Ltd, NVivo (released in March 2020). 2020.

Liamputtong, P., 2020. Qualitative Research Methods, 5th edition. Oxford University Press, Docklands, VIC.

Aengst, J., et al., 2022. Uncomfortable yet necessary: the impact of PPE on communication in emergency medicine. Int. J. Qual. Health Care 34 (4).

Legge, A.R., Nasser, M., Latour, J.M., 2023. 'You learn to smile with your eyes', exploring the impact of enhanced personal protective equipment on primary care dental practitioners in the UK: an interpretative phenomenological study. Community Dent. Oral Epidemiol. 51 (6), 1276–1283.

Holm, A., Dreyer, P., 2023. Nurses' experiences of the phenomenon 'isolation communication'. Nurs. Crit. Care 28 (6), 885–892.

Hoernke, K., et al., 2021. Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. BMJ Open 11 (1).

Wittenberg, E., et al., 2021. Opportunities to improve COVID-19 provider communication resources: a systematic review. Patient Educ. Couns. 104 (3), 438–451.

Ong, J.J.Y., et al., 2021. Headache related to PPE use during the COVID-19 pandemic. Curr. Pain Headache Rep. 25 (8), p. 53-53.

Kea, B., et al., 2021. An international survey of healthcare workers use of personal protective equipment during the early stages of the COVID-19 pandemic. J. Am. Coll. Emerg. Phys. Open 2 (2) e12392-n/a.

Ayton, D., et al., 2022. Experiences of personal protective equipment by Australian healthcare workers during the COVID-19 pandemic, 2020: a cross-sectional study. PLoS One 17 (6) p. e0269484-e0269484.

Wild, C.E.K., et al., 2022. Mixed-Methods survey of healthcare workers' experiences of personal protective equipment during the COVID-19 pandemic in Aotearoa/New Zealand. Int. J. Environ. Res. Public Health 19 (4), 2474.
Çiriş Yildiz, C., Ulaşli Kaban, H., Tanriverdi, F.Ş., 2022. COVID-19 pandemic and personal protective equipment: evaluation of equipment comfort and user attitude. Arch. Environ. Occup. Health 77 (1), 1–8.
Dahlen, H.G., Kumar-Hazard, B., Chiarella, M., 2020. How COVID-19 highlights an ongoing pandemic of neglect and oppression when it comes to women's reproductive rights. J. Law Med. 27 (4), 812–828.
Australian Midwifery and Maternity Alliance, Transforming maternity care: election 2022. 2022.