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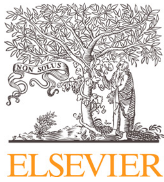

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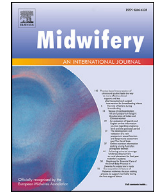

Informing women about maternal vaccination in Aotearoa New Zealand: Is it effective?

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Introduction

Aotearoa/New Zealand (NZ) follows a government-funded national midwifery continuity of care model for maternity care during pregnancy (Ministry of Health, 2021; New Zealand College of Midwives, 2019). It is recommended by health authorities in NZ that women are immunised against influenza, pertussis and COVID-19 during pregnancy (World Health Organization, 2005; Ministry of Health, 2020; UK Health Security Agency, 2021). Maternal vaccinations are administered with no cost to the vaccinee across the country in various locations, including general practices, community pharmacies (although pertussis has only been funded in this setting since late 2022 nationwide), and hospitals. Despite there being no fee to be vaccinated, in NZ, less than half of all pregnant women are vaccinated (Howe et al., 2020), which leaves many women and their infants at risk of these diseases (Ministry of Health, 2020). Furthermore, lower vaccination coverage for pregnant Māori (Indigenous people of New Zealand) and Pacific women (Howe et al., 2020) is likely to contribute to severe morbidity and hospitalisation in these groups (Nowlan et al., 2015). Internationally, ethnic minority groups and those most socioeconomically deprived also have lower vaccination coverage (Maertens et al., 2018; Frew et al., 2014; McHugh et al., 2019; Quattrocchi et al., 2019) indicating this global issue adversely affects those who may already face difficulties in accessing the healthcare they need.

Recommendations from health care professionals can influence pregnant women to choose vaccination (Mak et al., 2015; Kriss et al., 2019; Gauld et al., 2022b). Some women may not receive clear recommendations to have maternal vaccinations from their health care professional, and midwives' support of women's choice with reluctance to make personal recommendations or be 'pushy' might lead to women doubting the benefit or safety of maternal vaccinations (Gauld et al., 2022b). Limited knowledge of vaccines and diseases they protect against can discourage maternal vaccination (Wilson et al., 2015), while accessible information and education can improve vaccination uptake (Gauld et al., 2016; Duckworth, 2015; Wilson et al., 2019). Pregnant women need to understand the role of vaccination in pregnancy and its benefits (Nowlan et al., 2015; Wilson et al., 2019). However, credible and relatable information about vaccinating in pregnancy may not be available to everyone (Nowlan et al., 2015). Moreover, some women may feel overwhelmed by the amount of printed materials they receive during pregnancy (Duckworth, 2015) and instead might access variable quality websites and social media (Kriss et al., 2019; Duckworth, 2015) or friends and whānau (family) (Kriss et al., 2019) to support their understanding and decision-making. Relying on alternative methods for information about vaccines can leave some women misinformed and this may prevent them from being vaccinated (Gauld et al., 2016; Wilson et al., 2019). Messaging about vaccination needs to be tailored to the needs of

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communities (Pritchard et al., 2011; WHO Regional Office for Europe, 2019). Research investigating maternal vaccination messaging to pregnant women, including in marginalised communities and ethnic minorities has been undertaken (Frew et al., 2014; Duckworth, 2015; Stockwell et al., 2013; Kriss et al., 2017). However, there is a need for further research focusing on groups with lower vaccination coverage and exploring whether adequate information is being given to them in a way that meets their needs.

Because of the inequity in the vaccine coverage in pregnant Māori and Pacific women in NZ (Howe et al., 2020), further research is needed to identify how to support positive vaccination decisions in these groups. Previous researchers noted the need to explore how to optimise healthcare professional messaging about maternal vaccinations to Māori, and to include Māori women who have not had maternal vaccinations in research (Gauld et al., 2022a). The aim of this research is to investigate how Māori and Pacific women find out about vaccination during pregnancy, if the information given to them suited their needs, and how the delivery of information to Māori and Pacific women could be improved. Results pertaining to knowledge and decision-making about maternal vaccination is published elsewhere (Young et al., 2022) and the presented article focuses on information seeking behaviour and suitability of vaccination information for Māori and Pacific pregnant women.

Methods

Study design and setting

Semi-structured face-to-face interviews were conducted between May and August 2021 in two NZ cities, Dunedin (a major urban area) and Gisborne (a large urban area). The Dunedin population is approximately 11% Māori and 3% Pacific peoples and the Gisborne population is approximately 53% Māori and 4.5% Pacific peoples (Statistics New Zealand, 2020; id, 2020; Statistics New Zealand, 2018). Overall, Dunedin has a higher number of decile one (least socioeconomically deprived) areas, whilst Gisborne has a higher number of decile 10 (most deprived) areas (Environmental Health Intelligence New Zealand, 2018). To support recruitment, interviews, and analysis, one Māori and one Samoan research assistant were recruited in Dunedin, and in Gisborne an iwi healthcare provider supported the study.

Designing the interview guide

A semi-structured interview guide was developed following a literature review and input from a research advisory group consisting of Māori and non-Māori health research academics, a general practitioner, and pharmacists. Questions focused on the delivery of information to pregnant women including participants' experiences of being informed of vaccination during pregnancy, if the information was given in a way that suited their needs, and if the delivery of information could be improved. Because this research began before the COVID-19 vaccination was recommended in pregnancy, participants were only questioned about pertussis and influenza vaccination. The interview guide was piloted with one Māori and two Pacific women who had been recently pregnant, with no issues identified and no amendments required (please see Supplementary file).

Participants, recruitment and interviews

Purposive sampling of 15 Māori and Pacific women over 16 years of age was undertaken. Women who were pregnant or who had a baby recently (infant aged one year old or less) and who could respond to questions in English were recruited.

Tikanga Māori practices (Indigenous customary practices) were respected during the interview process and principles of Community-Up research were followed (Smith, 1999; Cram, 2001). A karakia (prayer or incantation) at the beginning of interviews was offered to Māori participants, and researchers worked to build whanaungatanga (relationships) at the beginning of the interview. The researchers promoted manaakitanga (respect and hospitality) by providing participants with resources and support throughout the project, including a supermarket voucher as an appreciation of participation.

Participants were recruited through many avenues including local midwives, social media, posters in the community and healthcare settings, through community groups, and snowballing. Informed consent was obtained before the interviews, with the aims of the study discussed with participants. Interviews were conducted by the first author (AY) with two research assistants, in a location that suited participants. Locations included local community outreach centres, primary care health centres, the University of Otago, and the women's homes. Women could bring along their pēpi (infant) and tamariki (children) to the interviews, although for most of the interviews the women attended on their own. Interviews were audio-recorded, transcribed verbatim, and checked by AY and research assistants for accuracy.

Analysis

To provide a framework to discover patterns amongst women's experiences and opinions, an interpretive description methodology was adopted (Thorne et al., 1997).

Transcriptions were reread multiple times by the first author (AY). NVivo Plus (QSR International LLC) was used for initial data analysis of the interview transcripts. The interviews were analysed by AY following a directed qualitative content approach (Elo and Kyngäs, 2008; Hsieh and Shannon, 2005) and the study aims were used to provide a structural framework to the analysis (deductive analysis) of *How do women learn about vaccination during pregnancy? Was information suitable?, And how could the delivery of information be improved?* Within the framework, the data were arranged into themes as they were identified (inductive analysis). During analysis, concepts and potential themes and sub-themes were reviewed against the dataset, and underwent further refinement by collapsing and reordering data grouping until the final themes were conceptualised. Following analysis, the themes were peer reviewed by the Māori Investigator on the project (EW) and sent to three participants for feedback (as a form of member checking), although only one participant replied. No changes to the findings were requested following this feedback process.

To support rigour, credibility, and dependability of results, the study processes were reviewed and adapted using the Trustworthiness, Auditability, Credibility, and Transferability (TACT) framework (Daniel, 2019). Trustworthiness was ensured through descriptions of where the data was collected from, peer review, collaboration with a diverse and skilled research team, and member checking. Furthermore, AY was aware that her background as a pro-vaccination health professional and mother (of Pākehā and Māori ethnicity) may have affected the study process and strived for reflexivity by reflecting on her own assumptions and what these may be bringing to the research. For example, acknowledging her own values and opinions and how these may affect those with opposing beliefs and keeping a journal for notes throughout the research process (Dowling, 2006; Palaganas et al., 2017). The collection of data and transparency of processes is included for auditability of the study. To achieve credibility, identified themes with direct quotations were peer reviewed and then sent to a selection of participants for verification (see above). The study setting and participants were described, so readers can assess the transferability.

The University of Otago Human Ethics Committee, (Health) provided ethics approval (reference: H21/063). Ngāi Tahu Research Consultation Committee at the University of Otago provided Māori research consultation.

Results

Fifteen women aged 20–37 years participated. The interviews lasted between 20 and 60 min. Nine participants identified as Māori, one as New Zealand European/Māori, three as Samoan, and two as Cook Island Māori. Six participants were pregnant when interviewed, eight participants had infants aged 1 year or under, and one participant was pregnant and had an infant under one year of age. Although all women responded to the questions in English, the Samoan research assistant aided during the interviews by translating some interview questions into Samoan for two participants (three and six). Of those who participated, six were unvaccinated/chose not to be vaccinated during their pregnancy, one was undecided about being vaccinated, six were vaccinated against either influenza or pertussis, and two were fully vaccinated. See Table 1 for a summary of the demographics, vaccination decisions, and midwife access.

Analysis

The analysis was undertaken within three main foci *How do women learn about vaccination during pregnancy?, Was information suitable?,* and *How could the delivery of information be improved?*

How do women learn about vaccination during pregnancy?

The three themes identified relate to the process of being informed about vaccination. The first two are about *who pregnant women get their information about vaccination from* (their healthcare provider, their whānau, and/or friends) and *how the information is given* (discussion, written information, and/or via the internet). The third theme is *Information is not provided* and encompasses discussions with participants who did not learn about maternal vaccination during their pregnancy.

Theme: who provides information about vaccination in pregnancy?. Thirteen participants reported being aware of vaccine recommendations during pregnancy, although a few women were only aware of one vaccine. Eleven of the women recalled having been told about vaccination by a healthcare provider and in most instances, information was provided by their midwife. Two had also learned about it in their antenatal class. Two women were informed about vaccination by the midwife and also received further explanation by their GP. One participant was informed about vaccination by receptionist staff at her general practice.

> "The ladies at the [front] desk who said 'have you had the immunisation for that yet? You're recommended to do that'… it hasn't really been a discussion with my midwife." [P14]

Five participants had been told about vaccination by their whānau or friends.

> "I think at the back of my head I always knew that they existed, just from, a lot of my friends having children just talking me through their experiences." [P15]

Two participants had been told about vaccines from their healthcare provider but sought further information from their whānau before deciding to vaccinate.

> "…my midwife would have told me about it but also my mum tells me, if I ask her a question she normally knows the answer. So, yeah she's told me about it as well." [P1]

Eight women reported hearing negative information about vaccines, including maternal vaccines from whānau or friends. Six of these women remained unvaccinated. Negative information discussed amongst friends and whānau included recollections of adverse events and misinformation about vaccine side effects and potential harm.

Table 1
Demographics, vaccination decisions, and midwife access of participants ($n = 15$).

Participant number	Ethnicity	Age (years)	Language most comfortable speaking	Stage of pregnancy/age of infant	Vaccination status	Approximate time when first saw midwife	First-time mother ?
1	Cook Island Māori	30	English	Infant is 3 months old	Vaccinated: Influenza Pertussis	8–12 weeks	No, 1 other
2	Cook Island Māori	37	Cook Islands Māori and English	Infant is 6 months old	Not vaccinated	20 weeks	No, 3 others
3	Samoan	34	Samoan and English	Infant is 11 months old	Vaccinated: Influenza Pertussis	6–7 weeks	No, 1 other
4	Samoan	27	Samoan and English	Infant is 2 months old	Vaccinated: Influenza	[information not gathered]	No, 1 other
5	Māori	23	English	39 weeks pregnant	Vaccinated: Influenza	4–5 months	Yes
6	Samoan	29	Samoan	Infant is 6 months old and 3 months pregnant	Not vaccinated	2 months	No, 2 others
7	Māori	22	English	8 months pregnant	Vaccinated: Pertussis	2–3 months	No, 2 others
8	Māori	29	English	Infant is 9 months old	Vaccinated: Influenza	6 weeks	No, 1 other
9	Māori	24	English	34 weeks pregnant	Not vaccinated	2 months	No, 2 others
10	Māori	26	English	Infant is 3 months old	Not vaccinated	18 weeks	No, 3 others
11	Māori	24	English	Infant is 12 months old	Not vaccinated	4–5 months	No, 2 others
12	New Zealand European/ Māori	31	English	8 months pregnant	Not vaccinated	12–14 weeks	Yes
13	Māori	31	Māori and English	6 months pregnant	Will vaccinate against: Pertussis	2–3 months	Yes
14	Māori	20	English	6 months pregnant	Undecided	2–3 months	Yes
15	Māori	29	English	Infant is 3 months old	Vaccinated: Pertussis	3 months	Yes

"I think I didn't want to get it because I have heard that if you get it, it actually brings it [influenza] on, just, I don't know." [P9]

"Friends who have had bad experiences… within my circle of friends. That scares you a little bit." [P8]

Two participants had heard negative information, but had decided to vaccinate regardless because they trusted their healthcare provider's information.

"Heard from family members or friends that it's not good to do it… but they're not doctors, so I wouldn't [listen]." [P7]

Theme: how information is given. In most cases information about vaccination was provided by a combination of discussion and written information, but sometimes only one of these methods was used. Eight women were provided with written information and their health provider also discussed it with them. Two participants were provided with information on multiple occasions.

"…repeat, repeat, yeah, midwife… just bring the paper information and she always talk about it. Lots about this [maternal vaccination]." [P3]

Two participants were informed about vaccination only through discussion with their health provider and it was not discussed in detail.

"They just said you need to get the [influenza] jab and you need to come back for your whooping cough jab and that's about it… just that one time." [P5]

Two participants were given written information for them to go through but it was not discussed with them by their doctor or midwife unless they raised questions.

"I just remember getting heaps of pamphlets and I just read through all of them. But I knew that there were key points that I needed to get vaccinated… I think it was pamphlets mostly and then if I had questions that's when we spoke about it." [P15]

One participant was only provided with information from her midwife after she requested it.

"… after I had asked my midwife, she had sent me some information." [P13]

Theme: information not provided. Six women reported that they were not given information about maternal pertussis and/or influenza vaccines. Two women were unaware of recommendations for both the maternal influenza and pertussis vaccines, two were unaware of the recommendations for the influenza vaccine and two were unaware of the recommendations for the pertussis vaccine.

"Oh, I didn't have that. I didn't quite have that info, just the flu one… I didn't know this about the vaccination for whooping cough." [P4]

Two women knew about the vaccines from previous pregnancies, but were not vaccinated in their most recent pregnancy because vaccination had not been discussed again and was not prioritised.

"It just didn't come up, yeah. And then because I was too busy working in my whole pregnancy, I just went with the flow really. I didn't go out of my way." [P11]

Another participant who had not yet decided about being vaccinated in pregnancy knew of the vaccines, but they had not been discussed by their healthcare provider.

"It hasn't really been a discussion with my midwife. I feel like if I wanted to get it, I'd have to bring it up to talk about it with her…" [P14]

Was information suitable?

Three themes were identified about whether the information and the way it was delivered met the needs of pregnant women. The themes are *effective communication and information delivery, ineffective communication*, and *searching for more*.

Theme: effective communication and information delivery. Some healthcare providers effectively communicated with women in their care about vaccinations in pregnancy. Communication was considered effective if women had positive views about the amount of information provided and how it was given, and whether the information gave them confidence to choose whether to vaccinate. Healthcare providers who clearly recommended vaccination often positively influenced women to vaccinate.

Eight women were happy with how information was provided during their pregnancy. Four particularly appreciated detailed and clear discussions about why vaccinations were recommended. Only three women considered the amount of information they were given about vaccination in pregnancy was adequate. However, one of these women were unaware of the influenza vaccine, indicating that sufficient information may not be delivered even if it seems to be 'enough'. One participant received repeated information and was happy to get information many times from multiple sources (e.g., midwife and GP) to support her understanding.

Seven participants were positively influenced and felt confident to be vaccinated after being informed by their midwife or GP about why vaccines are important and that they are recommended.

"It was helpful because I actually wasn't going to get it and then I decided that I should… when I got more information on it [from the midwife], I decided it would be better for my baby." [P7]

"Once she [the midwife] told me that it's passed on to my baby and it's good to get these certain weeks, then I was quite happy to go along and get that done." [P1]

One participant did not have in-depth discussions about vaccination with her midwife, but was influenced by the information she read in the pamphlets they had given her about the benefits of pertussis vaccination.

"I just, knew I wanted to vaccinate and then just looking at things like what whooping cough is and seeing how bad that is, you know, makes me go okay let's try and avoid this at all costs." [P15]

Two other participants described positive discussions about the COVID-19 vaccination organised for the Pacific community that changed their perception about vaccination, including maternal vaccination. However, because these discussions occurred after their pregnancies, these women had not been vaccinated during their pregnancy.

Theme: ineffective communication. Some women did not feel encouraged to vaccinate because they were not provided with information that made them confident to choose to be vaccinated and/or because they did not receive sufficient information to make an informed choice. Most participants wanted to be given more information about vaccination in pregnancy.

Four women did not feel confident to vaccinate after having discussions or receiving pamphlets about it from their midwife.

"[The information was] not really helpful at all because I still don't know that much about them now… They try and give you

the flu vaccine, but I've never had any. I'm too scared to get those while I'm pregnant." [P9]

"It's that, just the lack of understanding… because all that you are given is that brochure, yes I'll read it but I'm the type that would like to know more… yeah I wasn't confident." [P2]

Two participants described the necessity to receive more information to decide to vaccinate, particular for first-time mothers. One participant said:

"[healthcare providers should] give out more information about them, especially for first time mums because you really have no idea what's going on… if there was more details on it, instead of just saying you need the flu jab just because." [P5]

Six participants, four of whom did not get either vaccination, were not interested in receiving more information to aid their understanding of maternal vaccinations. Four participants did not think that finding out more information to support their decision-making was important or a priority, even if they felt that information was lacking.

"I just made excuses because I forgot or didn't just have time. But it was never a priority like for me to make that decision. It was just not a priority for me. That's why I just chose not to take it." [P2]

However, two participants indicated they would likely have changed their mind had they received more detailed information. One of these women did not receive information on vaccine safety in a way that suited her during her pregnancy. However, after her pregnancy, this woman attended an informative meeting with health experts where people met and discussed COVID-19 vaccination which resulted in her changing her negative perception about other vaccinations in pregnancy.

"If there was something else other than just the midwife telling me. If there was something else, like a gathering of some sort and they come and share the information, it would have probably changed my mind." [P2]

The other participant was only aware about influenza vaccine availability and indicated she would likely have chosen to get the pertussis vaccine if she had known about it.

Two participants did not want further information from their healthcare provider because they did not want the vaccine.

"My partner and I are sort of both anti-vax… I think it was mentioned, but because we're sort of not interested in vaccinations, we didn't go further with it." [P12]

Theme: searching for more. More information about maternal vaccination was searched for to support decisions about whether to vaccinate. Mostly, this was to support informed decision-making, but for one participant who labelled themselves anti-vax, it was to look for alternatives to vaccination. Some participants would use the internet to find more information than that given to them by their healthcare provider, and it may be seen as a preferred information source.

Five participants looked for further information because they wanted to make informed decisions about why they should vaccinate.

"I just like looking up different, trying to find the pros, of why to get them [maternal vaccination] done." [P13]

"I got answers to everything I wanted but I think if I wasn't that way inclined, I think I would not have been as well informed about things as I needed to be." [P15]

One participant who considered herself anti-vax wanted to undertake more research to find alternatives to vaccination.

"…if you wanted to find like alternatives and other things like that, you'd have to go and find it yourself." [P12]

Six participants said they would consider using the internet to find more information about vaccination if they felt they needed to know more.

"…the internet also exists now, so if I needed any more details I could always just go online and kind of google more things." [P15]

For one participant, the internet was preferable to the pamphlets she was provided with because you could access more information that was in the pamphlet.

"I might not read it but then if there's websites on there, I would go to it." [P2]

How could the delivery of information be improved?

Two themes were identified about participants' suggestions to improve the delivery of information about maternal vaccinations, *Preferred and trusted sources of information*, and *How information should be given*.

Theme: preferred and trusted sources of information. Eleven participants would like to get information about vaccination from a health professional they trust (e.g. midwife, GP, or nurse) and/or see most frequently during their pregnancy. Three participants would also like to get information about vaccination from the Ministry of Health. For others, having information from multiple trustworthy sources would be useful.

For some, midwives are preferred because they are the healthcare provider most seen during their pregnancy.

"I think it needs to come more from the midwife, because that's the person that you see directly for your pregnancy, who you trust for your whole pregnancy, from start all the way to six weeks…" [P8]

Having trust in the healthcare professional and feeling the health professional was concerned about their health and well-being was important.

"…someone who I kind of trusted and someone who has kind of shown interest in me not because it's their job but because it shows that they actually cared." [P15]

For some participants, receiving information from whānau and friends would be a useful and trustworthy option. For one, this would be useful in conjunction with information from health professionals. For the others, this was because healthcare providers were not trusted in their opinions on vaccinations.

Two participants who remained unvaccinated favoured information from whānau and friends over other sources because they distrusted their healthcare provider.

"Health professionals are just doing what the government says and how the Ministry of Health are doing things… and that's where [her friend is helpful], I'd find something and be like 'am I supposed to do this?' she tells me off if I'm doing the wrong thing." [P12]

Some participants are happy to get information from sources off the internet, for some it would be a useful adjunct to information from their healthcare provider. However, one participant did not trust her healthcare provider and would sooner look online to find out what she needed.

> “…you get told ‘oh there’s this vaccination and do this’, and they go ‘oh this is how bad things could be’ and whatever… for me, it’s like ‘yes I hear the reasons’, but like I said, I want to do more research… to find out what we can do if we’re not vaccinating.” [P12]

However, this participant, and three others, thought finding information on the internet could be troublesome. This was because of the differing information you are exposed to and the confusion it can cause, and they worried about misinformation.

> “I wouldn’t just go, I’m not even on social media, so I wouldn’t just go anywhere and just read whatever… I don’t google too much because I don’t want to end up in the wrong place.” [P12]

Theme: how information should be given. Options of how information should be given were considered, with discussion often preferred; however, multiple formats would be beneficial. Most participants liked to get vaccinations discussed in detail with them by their healthcare provider.

> “How to deliver a message? I’m thinking of all the possible ways, but I think face to face is the most appropriate one.” [P4]

Thirteen participants would watch a video about vaccination in pregnancy if given to them, although level of enthusiasm differed amongst participants.

> “If it’s a presentation captured by the video then I think no problem with that. I think videos are most appropriate one [way to deliver information].” [P4]

> “Yeah, I’d watch a video if it wasn’t too long.” [P1]

Ten participants thought that they should be given information about vaccination in more than one format, most often as discussion and written information but for some, the use of digital information delivery would be suitable.

> “Both [discussion and pamphlet], I think probably a discussion then you’re open to ask questions, then later on leaflet to read over.” [P13]

> “For some women it’s easy for them to read a text, or watching a video, lying down watching the videos. So, it depends on [the individual].” [P4]

Thirteen participants would read written information given to them, but were often not enthusiastic about this method of receiving information.

> “I do if they give me a pamphlet, but otherwise, yeah… just light reading when you get bored.” [P5]

> “I’d always skimmed read it and be like ‘oh what’s this?’ Yeah, if it’s not like interesting then I’d throw it away.” [P11]

For some participants, written information or videos are not suitable on their own and would not be engaged with. Five participants thought written information is not enough and should not be relied upon as the only information source because they may not be liked, they do not give enough information, they may be forgotten, or there may be a lack of time to read them

> “I like to know more. It’s not just what’s on the brochure, like, I need to know more.” [P2]

> “You know you don’t always have time to read things I suppose.” [P8]

Three participants indicated videos may not be ideal because you could not ask questions or because comments posted underneath online content could be troublesome.

These methods of information delivery were discussed further, within two subthemes, *Optimised discussion* and *Supplement with written information and videos*.

Subtheme: optimised discussions. This subtheme is broad ranging and covers suggestions for how verbal communication can be delivered in a way that is effective and encouraging. Participants had many ideas on how discussions could be improved to encourage vaccination. Some participants thought discussions about vaccination should occur more frequently and others appreciated clear and understandable messaging.

> “She was amazing because she knew what she was talking about. The person delivered the message was clear, and it was used in simple language that I can understand.” [P2]

Six participants would need active and meaningful encouragement for them to consider being vaccinated.

> “If they’re not so serious about it…then I’d just be like, ‘oh ok not bothered’. But if they were to sit me down and have a serious conversation and really be into it then maybe I would go away and think about it.” [P10]

> “I wish they had enforced it more for me to be convinced to take. But in a safe way.” [P2]

Three participants thought that group discussions or presentations about vaccinating would be a good way to inform pregnant women. This group presentation, or ‘fono’ for Pacific Island people, had been used recently in the context of COVID-19 vaccines and had helped with understanding about the vaccines and the open discussion was enjoyed by those who had attended.

> “I’m like a hands-on type of person so I’d like rather a workshop kind of thing.” [P11]

> “If there was something else other than just the midwife telling me. If there was something else, like a gathering of some sort and they come and share the information it would have probably changed my mind.” [P2]

Furthermore, for some, involvement of whānau or other community members in information sessions is important to help support understanding and decision making.

> “It has to be the whole community, it can’t be just the women coming in there. It has to be the whole family. The family needs to be included in these conversations. Because sometimes if the women are the only ones coming to get these information, and then go home and try to share to their husbands or share to their kids or whatever, any sort of information, they might not take what she is giving to them… the husband might say ‘no, don’t go and get it because I heard from such and such’ but I think having everybody on board will make a difference.” [P2]

Lastly, five participants liked to be given information and then have time to consider this before making their decision about vaccinating, and felt the autonomy to make the decisions themselves was important.

> “I prefer discussing it first, so then it’s like in my head processing and then if I take a leaflet home then I can go away and think about it and then come back and decide.” [P5]

Subtheme: supplement discussions with written information and videos. Written information was liked by five participants because it enables more information to be given than during discussion. Four participants liked it because it can be read over again later.

> “If I forget something then I can go back and read it, the leaflet… just so the off chance something does happen, so I can go back and look at it.” [P5]

Participants like videos for a number of reasons. Four participants thought videos were easier to understand than written information. Three participants thought they could get more information from a video than in a discussion.

> "I feel like it'll be good because you can explain more in a video, and everyone likes watching videos." [P14]

One participant liked informational videos because they could share them with whānau and they can align with their cultural values.

> "Seeing with something that will really capture my attention and I'm pretty sure it might capture the attention of your children as well when they are sitting there and like watching 'oh!' like you know, things that we can see apart from just reading." [P2]

> "Because you can see it, it just makes a difference. For us, as Pacific Island people, going back then, our stories were passed on through our carvings sort of thing or orally given to you. So, that's [a video is] what I would prefer." [P2]

Discussion

This study explored how pregnant Māori and Pacific women are informed about vaccination and if the information received was suitable for their needs. Only two of the 15 participants were vaccinated against both influenza and pertussis during their pregnancy. Most women had been informed about maternal vaccines by their midwife, but some were unaware of recommendations for vaccination for pertussis and/or influenza. Usually women had discussions about vaccination with their midwife and were also given information to read. However, sometimes it was only discussed without given written materials, they were only provided with written materials without accompanying supportive discussions, or women did not receive sufficient information for their needs. Insufficient information provision resulted in a lack of confidence in vaccination and an inability to make informed decisions. When participants searched for more information, it was generally to support informed decision making. Participants identified ways they would prefer to receive information. Face-to-face discussions would be ideal and some would like group workshops or presentations. Videos and written information would also be useful alongside discussion.

The lack of awareness of maternal vaccine recommendations is not a new finding (Gauld et al., 2016; Hill et al., 2018). Furthermore, as previously identified, some women who do not receive a vaccination in pregnancy may choose to do so if they had been made aware of vaccine safety and benefits in pregnancy (Nowlan et al., 2015; Duckworth, 2015; Wilson et al., 2019; Hill et al., 2018). In this current study, one woman had been made aware of vaccination by the reception staff at the GP surgery. This highlights that at every heath care contact there is the opportunity to make pregnant women aware of the recommendations for maternal vaccination and it should not only be the responsibility of a single healthcare professional. Health information provided to individuals during appointments is commonly forgotten (Kessels, 2003), and maternal vaccinations discussed in a busy and information-loaded hour-long midwife appointment is no exception. This includes multiparous women, who may be missing out on repeated recommendations to vaccinate with each pregnancy due to healthcare provider oversight. In this study, those who reported no vaccination discussion in their most recent pregnancy thought that vaccination was not important and seeking out information about vaccination was a low priority because of their busy lives. In a Belgian study, low vaccination rates in multiparous women was attributed to a lack of understanding that repeated vaccination with each pregnancy is recommended (Maertens et al., 2018). One NZ study from 2016 also highlighted lack of clarity around the advice in pregnancy can lead to lack of vaccination, in this case because they had received their pertussis vaccine within the last two years they thought they did not need it again (Gauld et al., 2016). Regardless of the reasons for being unaware, it should not be the women's responsibility to find out information about maternal vaccinations.

Pregnant woman are most often told about vaccines from a health professional (particularly their midwife (Duckworth, 2015) or general practitioner) or from other sources such as the internet (e.g., social media), media, posters, and their own research (Hill et al., 2018; Danchin et al., 2018). Just knowing that vaccinations are available may not be enough to encourage women to choose to be vaccinated during their pregnancy. A Canadian study that surveyed postpartum women almost two decades ago showed that higher levels of knowledge about maternal vaccination and a recommendation from their maternity care provider improved vaccination uptake (Tong et al., 2008). A NZ study found "recommendation of [maternal vaccinations] without discussion of benefits may be insufficient for women to prioritise vaccination" (Gauld et al., 2022a). Similarly, in our current study, women appreciated more in-depth discussions about why vaccines are important and felt confident to be vaccinated after a clear recommendation to do so. Nevertheless, one woman felt she had enough information about vaccination yet she was unaware of the influenza vaccine being recommended in pregnancy. This emphasises that healthcare providers need to be prepared to engage in more detailed discussions with women, including benefits of the vaccinations. Furthermore, it cannot be assumed that pregnant women understand the importance of receiving all of the recommended vaccines in pregnancy (i.e., influenza, pertussis, COVID-19), even if they have previously been vaccinated or have received one of the recommended vaccines in the current pregnancy.

Vaccine uptake can also be improved when there is whānau and friend support (Frew et al., 2014; Wilson et al., 2015), however, in one recent NZ study, whānau and friends largely did not influence women's decisions about vaccination (Gauld et al., 2022b, 2022a). Conversely, in this current study focusing on Māori and Pacific women, more than half of participants were discouraged to vaccinate following discussions with their whānau or friends, possibly reflecting the greater numbers of women who were not vaccinated in this study compared with the earlier study. Perception of vaccine safety can influence vaccination in pregnancy (Maertens et al., 2018) and if trusted whānau and friends are sharing misinformation about vaccine safety then it may be difficult to counter established opinions. Early effective communication with a trusted healthcare provider is likely to help prevent acceptance of misinformation provided by whānau and friends. This is particularly important at the time of the COVID-19 pandemic where misinformation about vaccine safety is a significant challenge (Hotez et al., 2021). Furthermore, addressing misunderstandings at the community level, rather than only at the individual level, could support more widespread knowledge and acceptance of maternal vaccination and help limit the spread of misinformation about the vaccine safety. To do this, responsibility is with health policy makers and healthcare providers to address this issue as it cannot be up to individuals or communities to find this knowledge on their own.

Every person in NZ has the right to make an informed choice about their health care (Health and Disability Commissioner, 1996). In NZ, women who are young, Māori, Pacific, or from an area of high deprivation may not be cognisant of maternal vaccines (Nowlan et al., 2015; Gauld et al., 2016) and lack the knowledge to make an informed decision about vaccinating in pregnancy. To

ensure information is understood and can be remembered, both discussion from a well-informed health care professional along with the provision of information to read later is recommended (Tang and Newcomb, 1998). Targeted multilingual written information (Deal et al., 2021) and other media (e.g. in video format) (Valdez et al., 2015) can be particularly useful for those who are not fluent in the local language as tools to aid understanding, allow for informed decision-making, and reduce decisional conflict. In this study, just over half of women had discussions with a healthcare provider (usually a midwife, but also general practice staff) and were given more information to read later. Receiving written information as well as a discussion was valued by some participants, even one who did not speak English as their first language. However, some women were not provided with supportive written information to reinforce conversations, which could make information recall difficult (Watson and McKinstry, 2009). Furthermore, other women only received pamphlets without discussion, and because pamphlets are often not read (Koo et al., 2003), or in a format and language not suitable for them, and women seem to respond better to health care professional's discussion about maternal vaccinations (Gauld et al., 2022b, Gauld et al., 2022a), solely relying on this passive way to disseminate health information is insufficient. Failing to provide information in a suitable way can influence a woman's decision not to vaccinate during pregnancy.

The lack of provision of basic information to pregnant women about vaccination is an unacceptable system failure and must be addressed. Improving awareness of vaccination is the bare minimum required to improve vaccination coverage and continued failure to address this knowledge gap is feeding health-system inequities. Clear recommendations for vaccination by healthcare professionals is also vital, however, a recent Australian study (Frawley et al., 2020) demonstrated that some midwives may feel they lack the training required to discuss vaccination with pregnant women and some feel they lack sufficient time to discuss vaccination, particularly with women are not interested in learning about vaccination or have complications during their pregnancy that take precedence. A recent NZ study found that those with recent training and experience with vaccinations are more likely to recommend women be vaccinated during pregnancy (Gauld et al., 2022b). All healthcare staff involved in maternal care should be vaccination advocates and ensuring promotional messages about vaccination are being conveyed. Importantly, in NZ, community pharmacies are also an option for informing and providing funded vaccinations (Gauld et al., 2020). It has been shown that funding maternal pertussis vaccination in New Zealand pharmacies increases uptake, particularly in Māori (Howe et al., 2022). In the NZ context, besides midwives, pharmacies may be the only other healthcare provider regularly attended during pregnancy. Therefore, providing funded vaccination for all recommended maternal vaccines in community pharmacies could help inform women about vaccines availability and benefits and further support positive decision making. It may benefit pharmacists and pharmacy staff to be trained specifically in initiating discussions about vaccinations with pregnant women to support provision of this service. Vaccinating in pharmacies can also remove potential barriers to vaccination by allowing walk-in vaccination services in a location that suits the individual.

Strengths and limitations

One strength of this study is the purposive sampling of Māori and Pacific women compared to other studies where these groups may be underrepresented (Hill et al., 2018). Also, we offered an opportunity for participants to review and comment on the accuracy of the constructed themes. A high proportion of the participants had not received one or both maternal vaccinations, providing useful data on information sources for such women. Interviews were reasonably long in duration to allow the topic to be discussed in-depth. Furthermore, interviews were undertaken with a Māori or Pacific research assistant to support building of relationships with participants and cultural context for analysis.

This qualitative study had a small sample size. We attempted to include women from a range of backgrounds, vaccination experiences and decisions so rich information is presented and findings could be transferrable to other settings. There was a possibility of recall bias with women being asked to remember their experiences. However, even if information was not recalled accurately, effective communication and information delivery would improve the participant's ability to recall whether they had been informed about vaccination. Women in younger age groups are less likely to be vaccinated during pregnancy (Howe et al., 2020; Rowe et al., 2019) and although we could recruit women from 16 years of age, we did not interview any women under 20. However, 12 participants were unvaccinated or only vaccinated against one of either pertussis or influenza so some comparisons may be inferred between these groups.

Conclusion

Women who do not receive appropriate information cannot make informed decisions about their own and their infant's health. Overall, this study showed that Māori and Pacific women who remained unvaccinated often appeared to experience ineffective communication with inadequate information and prioritisation. System changes are necessary to ensure vaccine recommendations and understanding of their benefits systematically reach every pregnant woman, regardless of history of parity. Preferably this should be provided as discussions with trusted healthcare providers, supplemented with supportive information to read or access online at a later time. A coordinated approach needs to be taken to ensure there are a range of key health contacts for pregnant women in their health care journey to aid being informed about maternal vaccinations.

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Ethical approval

The University of Otago Human Ethics Committee, (Health) provided ethics approval (reference: H21/063). All methods were performed in accordance with relevant guidelines and regulations.

All participants gave written informed consent for the study prior to undertaking the interviews. All participants were asked and consented to the interviews being audio recorded.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Amber Young reports financial support and travel were provided by Health Research Council of New Zealand. Natalie Gauld reports a relationship with Counties Manukau District Health Board that includes: employment.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2023.103636.

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