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RESEARCH ARTICLE

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'I'm glad my baby has weaned so I don't need to make that decision.' Understanding breastfeeding-related COVID-19 vaccine narratives on social media

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Abstract

Issue Addressed: During the coronavirus disease 2019 (COVID-19) pandemic, the infodemic has been highly visible. Vaccine-related advice and evidence-based guidelines for breastfeeding women have lagged, and, at times have been contradictory and confusing. Breastfeeding is an important public health issue with long-lasting health benefits for infants and mothers. This online social listening study aimed to understand breastfeeding-related narratives on social media during the early stages of the Australian COVID-19 vaccine roll-out.

Methods: Public content about breastfeeding and COVID-19 vaccines from Facebook pages with Australian-based administrators were accessed via the CrowdTangle platform. All related content posted between 1 December 2020–31 December 2021 was included. Content ($n = 29\,567$) was coded to an adapted vaccine narrative typology, and emergent themes were inductively identified.

Results: Most posts were promoting, sharing or discussing reliable information. However, the comments responding to these posts varied more widely. Several consistent questions, concerns, and information voids were evident, and misinformation and conflicting information contributed to confusion and challenges with decision-making.

Conclusions: These findings highlight the complexities associated with decision-making. Pregnant and breastfeeding women continue to be a priority group for vaccination, yet there were gaps in data, evidence and information. Incorporating social listening and infodemic management into public health work is important.

So What? Information voids, when identified early, can help inform public health messaging. Increasing social listening and infodemic training and skills in the health promotion workforce can help build future capacity and give insight into optimising public health communication and addressing misinformation.

KEYWORDS
breastfeeding, COVID-19, infodemic, social listening, vaccination, vaccine

1 | BACKGROUND

The coronavirus disease 2019 (COVID-19) pandemic has dominated global attention since 2020, and the accompanying infodemic (the overwhelming amount of information, both accurate and otherwise) has presented challenges to people's ability to source locally relevant information from trusted sources.[1] A person's information environment is impacted by a range of complex and interconnected factors including the social and commercial determinants of health, policy and regulation, as well as literacy and information access and quality. While the infodemic exists both offline and online, the spread of information and misinformation during the COVID-19 pandemic on social media has been prolific.[2]

Social listening is the practice of regularly monitoring conversations and public discourse across digital and non-digital data to gain an understanding of the questions and concerns of a population group, as well as to identify information voids and circulating misinformation and disinformation.[3] During the COVID-19 pandemic, many countries and agencies have established ongoing social listening and infodemic insights reporting practices.[4] Insights gleaned from these reports can be used to craft recommendations for action to better enable populations to source and access the information they need.

Pregnant and breastfeeding women are a priority group for vaccination due to their vulnerability to severe illness and ability to provide passive immunity via protective antibody transfer in utero and through breastmilk.[5] Vaccination is an important gold standard strategy in preventing disease and mitigating severe illness.[6] People's opinions of, and intention to receive a vaccine are impacted by diverse factors.[7] During the COVID-19 pandemic, the impact of the infodemic and misinformation on vaccine intention has been well documented.[2] Development and release of COVID-19 vaccines were closely watched, but exclusion of breastfeeding and pregnant women from initial clinical trials meant evidence-based advice for this group lagged and at times was contradictory and confusing. Evidence suggests that vulnerable groups are particularly susceptible to the effects of misinformation, often finding themselves the targets of misleading narratives. In Australia, lower education levels, non-native English speakers, lower levels of digital and health literacy, and lower trust in government and authorities are factors that increase susceptibility to mis/disinformation.[4] Pregnancy and lactation are periods of many personal and physical changes that can further compound a woman's vulnerability to the influence of social media. Breastfeeding is an important public health issue with long-lasting health benefits for infants and mothers.[8,9] Health professionals were concerned that this confusion may impact poorly on breastfeeding decision-making and outcomes.

Our previous investigation identified vaccines as the highest category of breastfeeding and COVID-19-related posts on social media over a 13-month period, comprising 69.5% of all analysed data.[10] Several studies have explored the impact of vaccine-related conversations on social media and the potential or real impact on vaccine update or acceptance. A 2022 rapid review of misinformation about COVID-19 vaccines on social media found a negative effect on vaccine hesitancy and uptake.[2] Another paper looking at disinformation on social media reported a significant relationship with increased vaccine hesitancy.[11] The COVID-19 vaccine roll-out commenced in February 2021, much later than in many other high-income countries. Australia's rapid initial response to the pandemic included testing, contact tracing, border closures and lockdowns; with varying levels of restrictions across the eight jurisdictions. By the time of the vaccine roll-out Australia experienced few community cases of COVID-19.[12] This study aims to explore and understand breastfeeding-related COVID-19 vaccine narratives on social media during the first year of the Australian vaccine roll-out.

2 | METHODS

2.1 | Data source and collection

The CrowdTangle platform (a public insights tool from Meta) was used to source data from public Facebook pages. The search parameters were set to include all Facebook pages where page administrators were based in Australia and included keywords for COVID-19, breastfeeding and vaccines. Our earlier research identified 656/945 COVID-19 and breastfeeding posts as being vaccine-related.[10] These vaccine-related posts were published from the 1st of December 2020 to the 31st of December 2021. Analysis on community responses to the post (comments) was carried out on all posts that had more than five responses ($n = 29\,530$ comments).

2.2 | Data analysis

Analysis was deductive. Identified posts and the corresponding comments were deductively coded to an adapted vaccine narrative typology.[13] The categories were based on those identified in previous research and included:

1. *Development, provision and access*: Posts relating to the process of the vaccine development, clinical trials, provision of and access to vaccines.
2. *Safety, efficacy and necessity*: Posts that discussed the safety and efficacy of vaccines, as well as the perceived need for them.
3. *Political and economic motives*: Posts relating to economic and political motives in terms of vaccines and vaccine development.
4. *Conspiracy theories*: Posts discussing conspiracy theories.
5. *Liberty and freedom*: Posts discussing how vaccines and vaccine mandates may impact freedom and liberty.
6. *Morality and religion*: Posts discussing religious or moral concerns about vaccines, their development and testing.

Based on preliminary analysis of comments, the research team added categories for 'vaccine positive' topics, 'other' content and tagging, when a user would '@mention' someone else, prompting a notification being sent to the user, alerting them of the tag. Although

tagging itself does not add much in terms of content, it does signal users bringing others to the conversation and we were interested in where and in what capacity that was happening most. Posts and comments were categorised to the overall topic areas, and then an inductive thematic analysis was used to identify key vaccine narratives within these predefined categories. The coding was carried out by one researcher, with another researcher independently coding a subset of data. Disagreements were resolved via discussion, and the dataset was reviewed.

2.3 | Ethical considerations

This study received ethical approval from the Curtin University Human Research Ethics Committee (HRE2021-0268). There are complexities in social media research on content that is publicly available. Although this information is publicly available ethical approval is required.[14] In addition to the measures around privacy, we considered guidance from the Association of Internet Researchers[15] and have slightly altered comments presented here without changing the context to prevent authors from being identified via reverse searches. All comments are included for illustrative research purposes, and none have been verified for accuracy of claims.

3 | RESULTS

The majority of the Facebook posts (90%, 595/656) were promoting, endorsing, sharing, or discussing reputably sourced information about breastfeeding and COVID-19 vaccination (see Table 1). These posts often originated from government websites, official bodies, or health-focussed bloggers. They frequently shared or promoted current evidence-based information, official guidance, or discussed new research.

However, the topics of comments responding to these posts varied widely (see Figure 1). While vaccine-positive comments were still high, topics regarding safety, efficacy and necessity were higher, and topic responses were more diverse. Some comments were published as standalone statements, whereas others became a dialogue between participants.

A narrative analysis of comments within each of the categories was conducted, seeking key themes of conversations. A summary of the key narratives in each category is described below.

TABLE 1 Categories of topics of the Facebook posts identified ($n = 656$).

Category	*N* (%)
Development, provision and access	12 (2)
Safety, efficacy and necessity	41 (7)
Political and economic motives	0 (0)
Conspiracy theory	2 (0)
Liberty and freedom	6 (1)
Morality and religion	0 (0)
Vaccine positive posts	595 (90)
Other	0 (0)
Total	656

3.1 | Safety, efficacy and necessity

In this category, several consistent narratives were identified. These included persistent safety concerns over the 13 months about the general safety of the vaccine, side effects for mums and babies, vaccine-induced miscarriage, and breastfed babies dying post-vaccination. Posters who were pregnant or breastfeeding discussed wanting to delay their vaccination until their baby was born or weaned, 'just to be safe'.

> I'm holding out. I wouldn't ever be able to forgive myself if something happened to my baby. I would say the risk is greater with the vaccine than the risk of covid.

> People should always read the information and weigh up the risks. There have been very few studies into the effects on pregnant or breastfeeding women. Apparently at least 8 unborn babies were lost after their mothers were vaccinated and were reported to VAERS [Vaccine Adverse Event Reporting System]*.
> *Please note, this is an unverified claim used for illustration purposes only.

> I'm glad my baby has weaned so I don't need to make that decision.

The safety of the COVID-19 vaccine was frequently compared to thalidomide, a drug used for morning sickness in the 1950s that resulted in birth defects. The refrain that women needed to avoid certain foods, medicines and alcohol during pregnancy and breastfeeding, yet were encouraged to take an 'untested vaccine' was a common narrative.

> An experimental vaccine for pregnant women? You've got to be kidding right … THALIDOMIDE ring any bells.

> Do you mean 'safe' the same way thalidomide used to be considered safe in pregnancy before they found out it causes birth defects and disabilities?

> Anyone remember the thalidomide drug for pregnant women in the late 50's, early 60's? How did that work out?

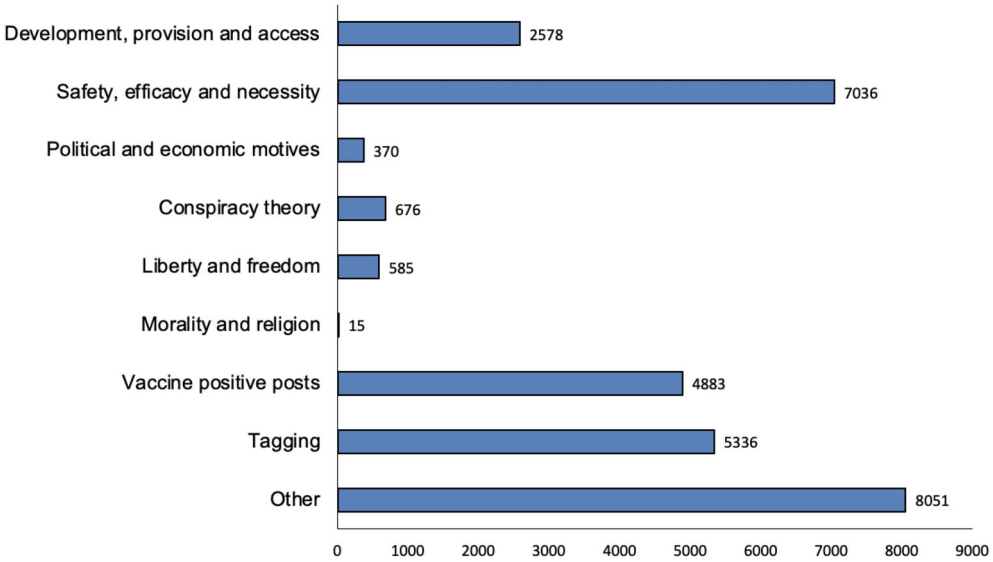

FIGURE 1 Categories of topics of the Facebook comments identified ($n = 29\ 530$). *N* of each category is shown in the graph.

> I was advised by doctor to avoid all medications, including Panadol, and alcohol during my pregnancies! Now the government is saying it's apparently safe for pregnant mums to have the experimental drug.

> So does this mean they can eat soft cheese and cold meats, raw fish & drink alcohol again? Just wondering seeing we have more info on the long-term effects of that then we do this vaccine in a pregnancy.

> It's advised that pregnant women should avoid certain foods, i.e. processed meats, soft cheese, alcohol etc., yet so many women are happy to be a part of this trial vaccine with no long or short term data. That's a huge risk I wouldn't take …

Safety concerns were a mix of genuine questions and concerns, and overtly strong anti-vaccine stances. Conflicting advice from professionals and guidelines contributed to confusion about safety. Users reported being told by health professionals, contrary to official guidelines at the time, that the vaccine was unsafe for pregnant and breastfeeding women, or to stop breastfeeding to be able to be vaccinated. Health professionals themselves commented on posts expressing concern—'*I'm pregnant and also a registered nurse. Not a chance I would take this whether I was pregnant or not*.' Users shared being turned away from General Practitioner-based vaccination clinics as they were breastfeeding.

Also evident in this theme were narratives about the perceived need for the vaccine. These changed in their intensity over the 13-month period and in different jurisdictions. Earlier in the year, some users reported not needing the vaccine as Australia had no or low cases of COVID-19. This changed to strong support for the need to be vaccinated as the COVID-19 outbreak intensified across the country towards the mid-year of 2021.

3.2 | Development, provision and access

Narratives referring to the lack of clinical trial data on pregnant and breastfeeding women were repeated. While there were conversations of the potential implications for mothers, the primary focus was on the potential short- or long-term implications for infants. Users referred to themselves and their babies as being the test subjects or 'guinea pigs' for the vaccine.

> Neither of the vaccines have been tested in pregnant or breastfeeding women, and there are unknown effects on fertility.

> I don't think you will find a pregnant woman that would want that tested on her … Considering how hard it can be for some women to even get pregnant it's too much of a gamble …

In terms of access to vaccines and vaccination, conversations intensified in the second half of 2021 alongside the intensifying COVID-19 outbreak. While pregnant women were added to the list of priority groups for vaccination and during the study period, breastfeeding women were not. There was anger expressed at this lack of prioritisation of breastfeeding women for vaccine appointments and for the Pfizer vaccine as Australia experienced supply issues. These comments were especially heated when discussed alongside the potential benefits for infants of a breastfeeding mothers passing on antibodies, but the mother being unable to secure a vaccine for herself.

> AstraZenica is not approved for breastfeeding women, according to my doctor. When is government going to open access to the Pfizer vaccine for all age groups who are breastfeeding?

> It is not right to keep us vulnerable in the community. They need to open the vaccine for those who want it.

> I gave birth to my daughter in the middle of a lockdown last year, and there are no words to describe how stressed I felt leaving the hospital, walking into the unknown, with a newborn baby in my arms, now there's research now to show antibodies from the COVID-19 vaccine pass through breastmilk. I was so relieved when I received my shot last week. But I wasn't able to get it because I was a breastfeeding mum, I got it because I work with children.

There were examples of women sharing tips on how to secure a vaccine appointment including travelling some distances and sharing petitions for prioritisation.

> I made more than 50 phone calls, stood outside for 2 hours and finally someone cancelled and they got me an appointment.

> Yes, good idea to travel all the way to Sydney to get the jab … it's not like they are a hot spot!

There were also examples of women reporting stopping breastfeeding, and receiving health professional advice to cease, to secure a vaccine and enable them to protect themselves and their families.

> I actually stopped breastfeeding my toddler so I could get vaccinated but I wouldn't have if she was still a tiny baby.

> I have heard paediatricians are telling women to stop breastfeeding and give their baby formula so they can have the vaccine!

3.3 | Vaccine positive posts

Vaccine-positive posts were evident across several narrative areas. A common narrative was regarding antibodies that may be passed on to babies if their mothers were vaccinated while pregnant or breastfeeding. There were numerous examples of women expressing happiness and pride about their ability to offer their babies some protection. These conversations included women discussing extending breastfeeding, considering re-lactation or discussing expressing and giving the milk to older children to offer them some protection.

> I had no issues with the vaccine and I carried on breastfeeding on purpose so I could give my baby some protection too! I'm all for giving my little one the best chance in life 🙌.

> So glad that my boy is exclusively breastfed and I am vaccinated, knowing he has some protection is great. I worry for my older child who has no protection and is going to school next year 🙌.

> What thoughts do we have on giving expressed milk to older children for the covid-19 antibodies? I currently have a toddler and a newborn due in 12 weeks. I was vaccinated during this pregnancy. Can I give my older child protection through expressed breastmilk?

3.4 | Political and economic motives

The political and economic benefits category received few posts in our research. Comments categorised to this theme included those suggesting health professionals, politicians or pharmaceutical companies were promoting the vaccine with the primary aim of financial benefit at the expense of people's health.

> Doctors will do anything to make some extra cash 💸💸 and when it comes back to bite on the backside they'll be covered …

> Because they have spent millions of dollars on it.

Narratives regarding political motives and a lack of trust in government were also evident.

> I don't trust bureaucrats, researchers, pharmaceutical companies or the TGA.

> [Health Dept] If I get the jab, and my baby dies from it, who is accountable?

> The misinformation comes from [Health dept] as well as the government and mainstream media.

3.5 | Conspiracy theories

Conspiracy theory narratives included the depopulation agenda, economic-related conspiracies, coordinated cover-ups as well as narratives about the illness and the vaccine being scams.

> They want the entire population unwell and controllable with never ending vaccines.

> The doctors have been silenced and told to tell everyone to get it.

> I have a copy of the letter to all medical doctors from [Health body] if you want to see their 'gag orders.'

> This is a way to kill off a third of the population. It won't be me or my family.

There were also claims that COVID-19 did not exist. The use of the clown emoji 🤡 was used in this topic, sometimes followed by calls to 'wake up' to respond to those who were not engaging in belief of conspiracy theories. Emotive language such as calls of 'genocide,' 'murderers,' and 'crimes against humanity' was employed.

3.6 | Liberty and freedom

Liberty and freedom narratives mainly related to vaccine mandates that were introduced by various State governments requiring proof of vaccination for certain activities. These comments discussed freedoms being infringed and people being 'forced' to be vaccinated to continue with daily life. There were also reported coercion and persuasion from health professionals for users to be vaccinated.

> I have seen footage of children being denied basic health care based on the parents vaccination status …

> Today it was announced that I have to get vaccinated to keep my job in 'at home aged care services' … I'm feeling really stressed at the moment as I don't want to take the 'vaccine.' I'm also stressed that they will implement laws that will only permit the vaccinated to go to the shop.

> This is fXXking terrifying. I just don't feel like anyone should be able to force us all to have the vaccine 💉.

3.7 | Other

This category included posts not directly related to vaccination and breastfeeding, including people questioning the credentials of others, discussing COVID-19 treatments, or where the context was not clear (replying to a comment that had since been deleted). A number of comments in this section focused on a change in language on some official posts to offer more gender-inclusive terms. The topic of Morality and Religion was minimal in this study, with only 15 comments being identified.

4 | DISCUSSION

This study examined comments and posts on public Facebook pages over a 13-month period during the COVID-19 pandemic that were related to the COVID-19 vaccine and breastfeeding. It builds on previous research by utilising a set of vaccine narrative categories developed during COVID-19 for vaccine-related narratives online.[13] While our focus was Australia, data crosses international boundaries and the findings we report will be of interest to a broader audience. In our study, comments related to Political and Economic motives were one of the lowest, while the previous study by Smith et al., which developed the typology, listed this as the highest category.[13] Many of the social media posts included in the Smith et al. study originated from United States-based contributors and were posted at a different time in the pandemic, which may have accounted for differences. This underscores the importance of localising results.

This study has identified narrative themes of conversations about COVID-19 vaccines and breastfeeding. There were ongoing and persistent concerns about safety and efficacy, as well as differing narratives around perceived need, as the COVID-19 outbreak surged in Australia. One key repeated narrative was that the exclusion of pregnant and breastfeeding women from the initial clinical trials for the COVID-19 vaccine meant that there was insufficient safety data. Vulnerable groups will likely continue to be excluded from early trials due to safety reasons,[16] but findings from this research tell us that we need to be better prepared to communicate risk to this group with the data available and the reasons behind staged trials in a health emergency.

This research identifies complexities and contributors to vaccine-related narratives for breastfeeding women, including the intricacies in decision-making. Facebook is widely used[17] and comments varied in intensity, including emotive posts shaming mothers and telling them their decisions were harming their children. There were occurrences where the comments appeared to have influenced an individual's decision to get vaccinated, or to continue breastfeeding. There were also threads of users who had been vaccinated expressing pride and happiness that they had been able to pass some immunity on to their infants via their choice to be vaccinated. This research reports on those who commented, but the wider audience who read comments will be much higher, as comments are just one metric of interaction.[10]

The information environment is important to understand. How people engage with information, both offline and online, is impacted by many factors, including education, social norms, trust in authorities and digital and health literacy.[18] Applying a health promotion approach to the information environment, including misinformation identification and management, can help to identify and target some of the underlying drivers and determinants of infodemic experience.[19] Health promotion practitioners are uniquely positioned to take a leadership role in this work. Creating supportive environments for health is a cornerstone of health promotion, as defined in the Ottawa Charter.[20] Approaches to creating and supporting healthy information environments require a systems approach to this complex area. This includes looking broadly at social, commercial and other health determinants, policy, regulation and literacy, as well as the provision of accessible, appropriate and accurate information from trusted sources. The multi-disciplinary approach needed across many areas will be well informed by preventative approaches designed for health issues such as tobacco, obesity and physical activity.

While this study used social media data only, it is important to look to community sources and integrate online and offline data to get as equitable and complete a picture as possible.[21] A recent

study on vaccine discourse has highlighted that relying solely on online data may result in a limited understanding of the issues.[22] It will be important that next steps include this integration. Another important next step will be to investigate and validate a machine learning model to alleviate the burden of manual categorisation of data into themes and enable more rapid and wide-spread application of data to inform infodemic insights, health promotion messaging and strategies.

Information voids were evident throughout the year and conflicting and outdated content, from service providers, international agencies and within government websites, contributed to confusion and expressions of overwhelm with information volume. From analysis of the content, it was evident that visuals were important, particularly emoji and gifs, but also photos and screenshots. Targeted anti-vaccination content was evident, as was confusion about scientific processes and understanding evidence. From these findings we recommend that public health practitioners:

1. Understand and anticipate information voids when pregnant and breastfeeding women are excluded from clinical trials, and plan for early identification and responsive action.
2. Understand and anticipate how information regarding guidelines and advice crosses international boundaries, and how conflicting information contributes to confusion.
3. Widen social listening understanding beyond misinformation to include broader dimensions and aspects of the information environment and incorporate social listening and infodemic monitoring into wider public health work.
4. Broaden analysis from just textual content being shared and understand the importance and nuance of image-based content, including emoji, gifs, screenshots and photo sharing.
5. Increase efforts to build public scientific, digital and health literacy.
6. Work within multi-disciplinary teams, including with communications teams to create collaborative strategies that address the wider determinants and impacts of infodemics and develop targeted and informed interventions.

5 | STRENGTHS AND LIMITATIONS

Despite Australian's reliance on the use of social media for information exchange, few studies have explored elements of the infodemic, including misinformation targeting pregnant and breastfeeding mothers. Through this study we were able to extract a dataset over a significant period of the COVID-19 pandemic when vaccine access, evolving information from government/health care sources, isolation and significant uncertainty were at a peak. This study described data from public Facebook posts and comments over a 13-month period. This limits the ability to generalise as it excludes conversations from other data sources and, importantly, describes digital data only and is not triangulated with offline data. While we were focussing on breastfeeding, conversations frequently included both pregnancy and breastfeeding-related content and conversations.

6 | CONCLUSION

The results from this study describe COVID-19 vaccine-related narratives for breastfeeding women over a 13-month period that covered the first release of COVID-19 vaccines globally, and the first year of roll-out in Australia. Pregnant and breastfeeding women are a priority group for vaccination, yet the findings of this study highlight mothers experienced gaps in data, evidence and information. Lessons from the COVID-19 pandemic demonstrate that understanding how to incorporate social listening and infodemic management into public health work is important and health promotion practitioners are uniquely positioned to lead on this work. Using social listening to understand changes in narratives and the information environment on social media overtime will give important insight into how to engage with this group around vaccination and inform future health emergencies.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ETHICS STATEMENT

This study was approved by the Curtin University Human Research Ethics Committee (HRE2021-0268).

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