

Mapping breastfeeding and COVID-19 related content and engagement on Facebook: Results from an online social listening study

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Abstract

Issue addressed: The COVID-19 pandemic has seen evidence and advice evolve quickly. Since the start of the pandemic there has been confusion and concern about breastfeeding and COVID-19, and advice for this group has at times been contradictory. The volume of information on social media has exacerbated this. This study aimed to understand breastfeeding-related COVID-19 information sharing on social media during the global and Australian vaccine roll-out.

Methods: The CrowdTangle platform was used to source data from December 2020 to December 2021. Posts were categorised to intent and source and mapped to a timeline of pandemic-related events and announcements. Descriptive analysis was used to understand data distribution patterns and qualitative analysis for post-intent.

Results: A total of 945 posts were included. Post-interactions ranged from 0 to 6500. Vaccine-related posts were the highest in number and increased over time. Non-profit organisations shared the highest number of posts ($n = 241$), but interactions were highest with personal and government accounts. Peaks in posts and interactions mapped to key pandemic-related announcements and events.

Conclusion: These results describe the breastfeeding and COVID-19 related content shared on Facebook over 13 months, and the associated interactions. Breastfeeding is an important public health issue and breastfeeding women have experienced conflicting and confusing breastfeeding-related information during the COVID-19 pandemic. Better understanding of social media usage, and the monitoring of changes in usage, as an emergency unfolds, can help target communications. This article adds to the evidence in understanding user reactions to COVID-19 related breastfeeding information on social media.

So what?: Social listening is an important part of health communication and infodemic management. Understanding how users react to and engage with COVID-19 related breastfeeding information on social media can help to understand how the general public perceives and responds to health advice and other information being shared.

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KEYWORDS

breastfeeding, COVID-19, health promotion, public health, social listening, vaccination

1 | INTRODUCTION

On the 11 March 2020, the WHO Director General declared the coronavirus disease 2019 (COVID-19) outbreak a pandemic.¹ By the end of December 2021, a total of 288 million COVID-19 cases and 5.44 million deaths had been recorded,² with experts estimating the true burden to be much higher.³ The COVID-19 pandemic has overwhelmed health systems globally and led to a range of isolation measures including travel restrictions in a bid to reduce mobility and control the spread of cases.² In Australia, international borders were closed and mandatory hotel quarantine was introduced in March 2020.⁴ As the pandemic continued, and until international borders reopened in 2022, Australian states and territories adopted different approaches, controlling borders and managing isolation measures and restrictions on a localised level.

2 | COVID-19 AND RECOMMENDATIONS REGARDING BREASTFEEDING

Since the start of the pandemic there has been confusion and concern about breastfeeding and COVID-19. This includes confusion as to whether women with COVID-19 could safely breastfeed⁵; if COVID-19 was able to be transmitted to the baby through breastmilk⁵; and if vaccines were safe for breastfeeding women.⁶ There was sometimes contradictory advice between global jurisdictions. For example, some countries advised the separation of mother and infant if the mother was COVID-19 positive, while others advocated for mothers and infants to be kept together.⁵ As social media enables international guidance to be communicated quickly, these discrepancies in protocols about the same virus increased parental concerns and contributed to uncertainty. The rapidly evolving advice has made it difficult even for health professionals to keep up to date with information. Some mothers have reported significant anxiety to successfully breastfeed to provide some protection to their babies.⁷

The pandemic response has seen COVID-19 vaccines developed quickly, and under immense public interest and scrutiny. As the vaccine roll-out commenced around the world, recommendations for breastfeeding women evolved quickly. The UK was the first country to approve the Pfizer vaccine under an emergency-use authorisation on 2 December 2020, 7 months after the start of clinical trials.⁸ On the 20th of December, women in the UK were advised to wait until they had stopped breastfeeding to have a vaccine, with health professionals expressing concern this could lead to early breastfeeding cessation.⁹ Ten days later, on the 30th of December, the Joint Committee on Vaccination and Immunisation in the UK advised there was no known risk for breastfeeding women and that eligible breastfeeding women should be offered the Pfizer vaccination.¹⁰ At the same time, the United States Food and Drug Administration was not

issuing recommendations, but 'leaving open' the possibility of vaccination for breastfeeding women.¹¹

In Australia, the Pfizer vaccine was provisionally approved for use on the 26 January 2021.¹² At times the vaccine roll-out in Australia experienced both supply and acceptability issues and there was limited availability of the mRNA Pfizer vaccine (the preferred vaccine for breastfeeding women¹³) during 2021. The other recommended mRNA vaccine, Moderna, was only available in Australia from September 2021.¹⁴ Vaccine eligibility was structured by a prioritisation schedule where vaccines were offered in phases to the population by priority work and health status (for example, first priority was to front-line workers and aged and disability care residents).¹⁵

Breastfeeding has significant health benefits for infants and mothers.^{16,17} As data continued to emerge, mothers anecdotally reported confusion and frustration.⁷ COVID-19 has negatively impacted on breastfeeding intention in some instances⁹ and health professionals have expressed concern about the impact of COVID-19 on breastfeeding decision-making.¹⁸

3 | INFODEMIC AND SPREAD OF MISINFORMATION

Even before the declaration of COVID-19 as a pandemic, the WHO Director General announced that we were also dealing with an infodemic.¹⁹ An infodemic is the spread of misinformation and deliberate disinformation, and also an over-abundance of information.²⁰ As vaccine development has progressed, the population has watched, in real time, each clinical trial stage, each changed recommendation, each failure and success. Never before has a vaccine development process been so closely scrutinised and followed by the public, particularly on social media. This had led to a significant amount of misinformation and disinformation (hereafter referred to collectively as misinformation), and confusion with how to filter the vast amounts of information.²¹

Australians are avid users of social media, particularly Facebook. A 2020 social media survey found 91% of Australian female respondents used Facebook.²² Of those aged 18-29 years, 55% checked social media at least 10 times a day, with the average Australian Facebook user accessing the platform 29 times a week.²² As the pandemic has progressed, more Australians have been turning to online and digital sources for parenting information.²³

The results described in this study are part of a broader investigation into how COVID-19 related breastfeeding information has been disseminated and shared on social media, how it has been received, and how patterns of information exchange and engagement have changed overtime in relation to key milestones. This social listening study has used the CrowdTangle platform to gather data and aims to describe how users engaged with breastfeeding-related information about COVID-19 on social media.

4 | METHODS

4.1 | Research objective

To describe breastfeeding-related COVID-19 information sharing and user reactions on social media in Australia during 2021, encompassing the start of the global, and Australian vaccine roll-outs.

4.2 | Research questions

- What was the volume of COVID-19 related breastfeeding social media posts between Dec 2020 and Dec 2021?
- Which providers were posting the most content and how did users react to these posts?
- What was the intent of posts and how did this change over time and in relation to key events?

4.3 | Search strategy

CrowdTangle is a public insights tool from Meta that allows researchers to follow, analyse and report on public content on social media.²⁴ Public pages and groups can be tracked across Instagram and Facebook. A feature of CrowdTangle is the search function that allows users to search across the whole public Facebook dataset.²⁴ The user enters the search terms, defines the search parameters and runs the search with data then provided from across the dataset.

For this research, search terms were entered for breastfeeding and COVID-19 with the search time-period set as 1 December 2020 to the 31 December 2021.

4.4 | Inclusion and exclusion criteria

Posts were eligible to be included if they came from public Facebook pages where administrators were based in Australia. This feature is only available when searching by page, rather than group, so groups were excluded for this search strategy and only Facebook pages were included. Further, posts that had since been deleted, so researchers were unable to identify the post-intent, were excluded. Posts that were reviewed and considered irrelevant were also excluded. Irrelevant posts included those returned in the search but were clearly unrelated to breastfeeding, for example, by containing breastfeeding as a hashtag only, even though the post was about something else.

4.5 | Ethical considerations

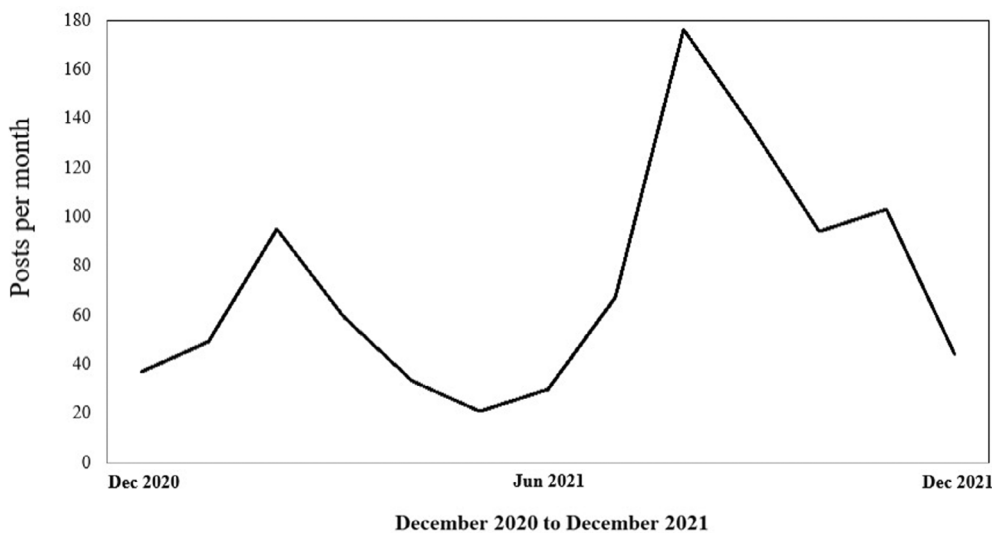
There are ethical considerations with social media research. While users may have agreed to certain conditions on signing up to an account, there may be expectations of privacy. This research applied for waiver of consent as is consistent with the Australian National

TABLE 1 Interactions by posts shared by providers

| Provider type and number of posts | Total interactions and (average interactions per post) | Comments | Shares | Likes | Love | Wow | Ha ha | Sad | Angry | Care |
|-----------------------------------|--|--------------|------------|--------------|------------|-----------|-----------|------------|-----------|-----------|
| Community (n = 101) | 4295 (42.5) | 1115 (26%) | 554 (13%) | 1738 (40%) | 141 (3%) | 64 (1%) | 144 (3%) | 138 (3%) | 356 (8%) | 45 (1%) |
| Personal (n = 77) | 26 730 (347) | 4661 (17%) | 2987 (11%) | 12 819 (48%) | 4970 (19%) | 162 (<1%) | 226 (<1%) | 355 (1%) | 239 (>1%) | 311 (1%) |
| Government (n = 135) | 51 296 (380) | 21 878 (43%) | 4544 (9%) | 16 445 (32%) | 2154 (4%) | 325 (<1%) | 903 (2%) | 409 (<1%) | 4372 (9%) | 266 (<1%) |
| Educational (n = 30) | 2905 (97) | 499 (17%) | 244 (8%) | 1783 (61%) | 351 (12%) | 2 (<1%) | 5 (<1%) | 2 (>1%) | 5 (>1%) | 14 (>1%) |
| Medical (n = 155) | 13 895 (89) | 1450 (10%) | 1677 (12%) | 4950 (36%) | 1061 (8%) | 95 (<1%) | 11 (<1%) | 153 (1%) | 51 (<1%) | 117 (<1%) |
| Media (n = 114) | 16 222 (142) | 6269 (39%) | 1392 (9%) | 4691 (29%) | 541 (3%) | 172 (1%) | 532 (3%) | 1 004 (6%) | 1300 (8%) | 321 (2%) |
| Other (n = 39) | 2220 (57) | 160 (7%) | 240 (11%) | 1441 (65%) | 272 (12%) | 2 (<1%) | 6 (<1%) | 45 (2%) | 31 (1%) | 23 (1%) |
| Non-profit (n = 241) | 11 737 (48.7) | 2782 (24%) | 2221 (19%) | 5033 (43%) | 744 (6%) | 121 (1%) | 44 (<1%) | 85 (<1%) | 629 (5%) | 78 (<1%) |
| Politician (n = 53) | 12 193 (230) | 2928 (24%) | 1983 (16%) | 4315 (35%) | 230 (2%) | 432 (4%) | 72 (>1%) | 1,090 (9%) | 794 (6%) | 349 (3%) |

TABLE 2 Total posts by intent category

| Post-type | No of posts (n = 945) | Total interactions (n = 141 493) | Average interaction per post |
|--|-----------------------|----------------------------------|------------------------------|
| Vaccine-related | 657 (69.5%) | 109 194 (77.2%) | 166.2 |
| General breastfeeding | 105 (11.1%) | 13 298 (9.4%) | 126.6 |
| Event post | 93 (9.8%) | 1118 (0.8%) | 12 |
| Safe Breastfeeding if COVID-19 positive | 48 (5.1%) | 10 482 (7.4%) | 218.4 |
| Service provider changes | 27 (2.9%) | 3255 (2.3%) | 120.6 |
| Keeping mum and baby together if COVID-19 positive | 15 (1.6%) | 4146 (2.9%) | 276.4 |

**FIGURE 1** Total posts over time.

Statement on Ethical Conduct in Human Research.²⁵ Only publicly available posts on Facebook pages were included and no individual user demographics were collected. As such data are presented in the aggregate and no personally identifiable data are included. This study underwent review and was approved by the Curtin University Human Research Ethics Committee (HRE2021-0268).

4.6 | Data analysis and categorisation

Descriptive statistics were used to describe data. Post-interactions included anytime a user engaged with a post, such as sharing, commenting or adding a reaction (like, love heart, angry face, etc). Posts were categorised to content source (organisational type) and post-intent (content of the post). CrowdTangle provides the category type of the page (i.e., Government, non-profit), these were reviewed and condensed for ease of analysis (e.g., pages in Medical, Hospital, and Ob-gyn categories were combined into Medical).

A thematic analysis was conducted and posts inductively coded to categories. Determining the themes for categorisation was initially conducted by the lead researcher (BW). To validate reliability, the

dataset were provided to another researcher (SB) who independently reviewed a sample of 100 posts, 10.6% of the total dataset. On initial blind assessment there was intercoder agreement with 91 posts or 91%. Some of those where disagreement was observed could fall into several categories due to the nature of the comments. Agreement was reached through discussion on these nine posts and the entire dataset reviewed by BW. Categorised posts were mapped to a timeline of vaccine and breastfeeding-related announcements to gain insight into how patterns of information developed and changed throughout the phases of vaccine roll-out, and how reactions changed over time.

5 | RESULTS

Initially, 1022 posts were identified, 72 were removed as irrelevant on first review. An additional five were removed on closer review as the posts had been removed from Facebook and the post-intent was not able to be ascertained. This left 945 posts that were included in the analysis. These posts had a total of 141 493 interactions, including 42 260 comments. Interactions

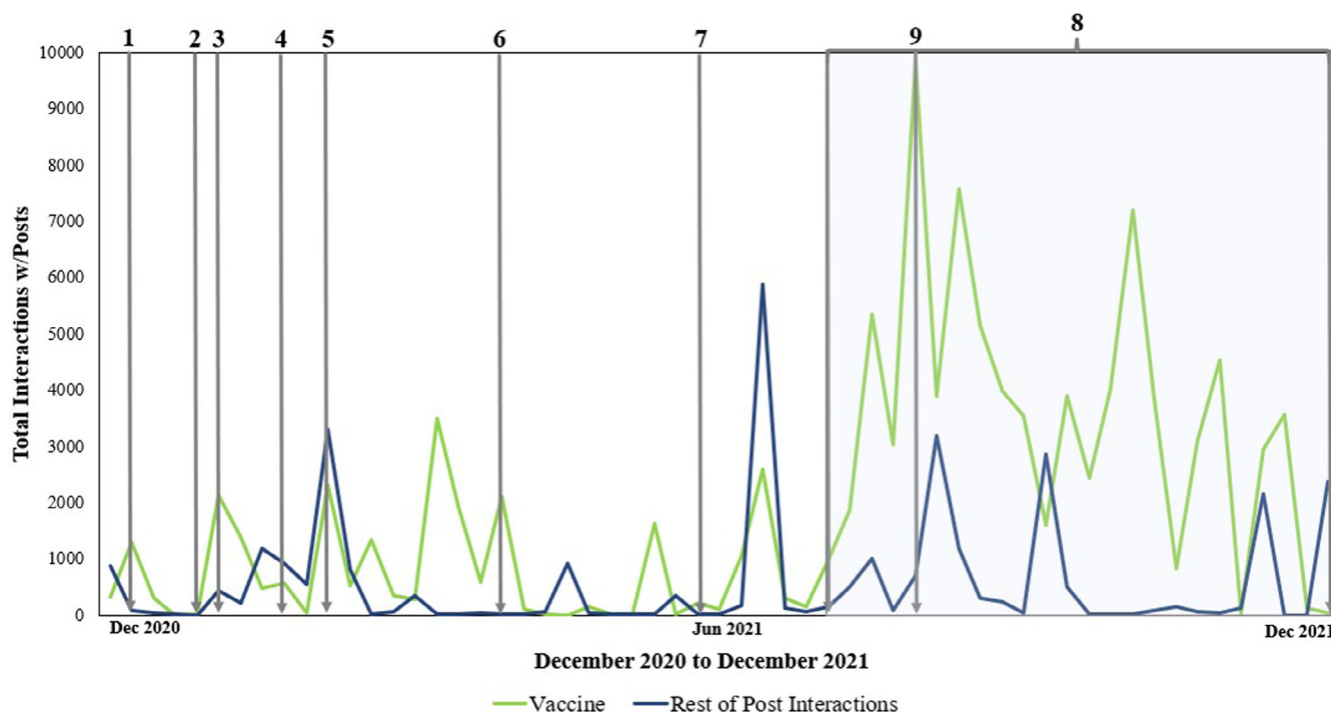


FIGURE 3 Number of post-engagements related to vaccinations vs. others per week.

TABLE 3 Key vaccination events or announcements

| Flag | Date | Event or announcement | Country |
|----------------|-------------------------------|---|-----------|
| 1 | 10 December 2020 | United States Food and Drug Administration 'leaves open' the possibility of vaccination for breastfeeding women. ²⁶ | USA |
| 2 | 30 December 2020 | Joint Committee on Vaccination and Immunisation in the UK advised there was no known risk for breastfeeding women and that eligible breastfeeding women should be offered the Pfizer vaccination. ¹⁰ | UK |
| 3 | 7 January 2021 | Department of Health releases National Vaccine strategy. ¹⁵ | Australia |
| 4 | 29 January 2021 | National vaccination campaign commenced as vaccine roll-out begins. ²⁷ | Australia |
| 5 | 12 February 2021 | Department of Health releases shared COVID-19 vaccination decision-making guide for women who are pregnant, breastfeeding or planning pregnancy. ²⁸ | Australia |
| 6 | 7 April 2021 | Australian Breastfeeding Association, Royal Australian & New Zealand College of Obstetricians and Gynaecologists (RANZCOG) and the New Zealand Breastfeeding Alliance release joint guidance. ²⁹ | Australia |
| 7 | 9 June 2021 | Joint statement between RANZCOG and the Australian Technical Group on Immunisation (ATAGI) about COVID-19 vaccination for pregnant women. ³⁰ | Australia |
| 8 ^a | 24 July 2021-31 December 2021 | Significant COVID-19 outbreak in Australia. See details below. | Australia |
| 9 | 19 August 2021 | RANZCOG releases statement clarifying the Astra Zeneca vaccine is safe for breastfeeding women amid increasing COVID-19 outbreak in Eastern Australia. ³¹ | Australia |

^aOn the 24 July 2021 Australia's most populous state of New South Wales recorded 163 new locally acquired COVID-19 cases,³² with ATAGI issuing a statement strongly advising vaccination with any vaccine in relation to the increased risk of COVID-19 and supply constraints with the Pfizer vaccine.³³ This outbreak continued to grow and spread to other states. On the 31 December 2021 Australia recorded 30 363 new cases of COVID-19.² At the start of the outbreak the Pfizer vaccine (the preferred vaccine for women who were breastfeeding or pregnant), was in very limited supply in Australia. An online petition called for new mothers to be prioritised for vaccination, and on the 19 August 2021 the RANZCOG released a statement clarifying AstraZeneca as being safe for breastfeeding women.

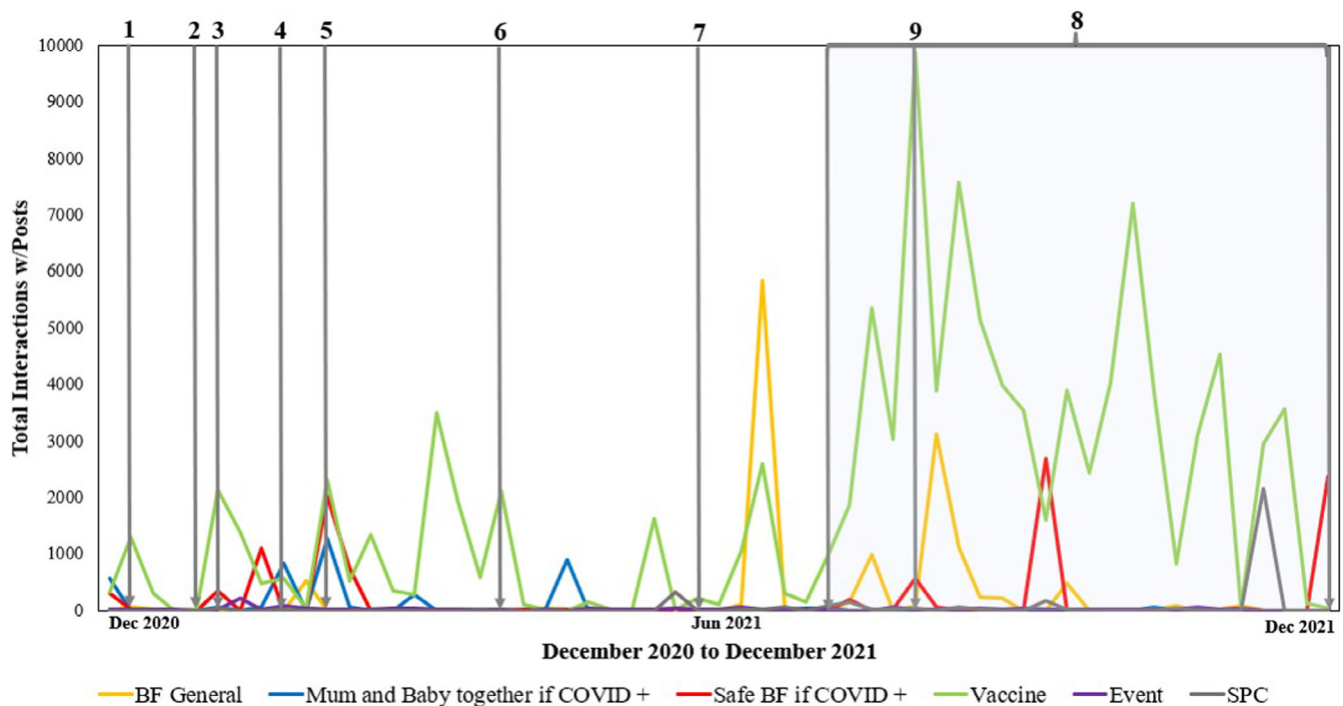


FIGURE 2 Number of post-engagements per week. BF, breastfeeding; SPC, service provision changes.

with individual posts ranged from 0 to 6500. Posts were categorised into provider type and post-intent. Table 1 shows total number of interactions, comments, shares and reaction types for each provider type.

Posts were also categorised on the overall intent of the post, that is, overarching categories were identified, these were:

- Event post—when the post-referenced breastfeeding and COVID-19 but an event (i.e., a webinar or a breastfeeding group with a speaker) was the primary intent of the post.
- Keeping mothers and babies together if COVID-19 positive—included immediately post-partum, birthing if COVID-19 positive and the impact on breastfeeding.
- Service provision changes—included posts about restricted face-to-face breastfeeding support and changes to services due to COVID-19 restrictions.
- Safe breastfeeding if COVID-19 positive—posts discussing if breast milk from a mother with COVID-19 was safe for baby or if breastfeeding could be safely carried out.
- Vaccine-related content—Included discussion of the perceived safety and benefit for mothers and babies.
- General breastfeeding—these included general breastfeeding posts that did not specifically relate to one of the above topics.

The vast majority of posts (69.5%) and interactions (77.2%) were related to COVID-19 vaccines. Table 2 shows the total posts per category and average interactions per post in each category.

The total aggregate number of posts overtime is shown in Figure 1, with a clear peak at the start of the Australian vaccine roll-

out in February and March, and again from July when outbreaks in the states of Victoria and New South Wales occurred, followed by other states once internal borders were opened and restrictions were relaxed. The key breastfeeding-related vaccination announcements are shown in Table 3.

Post-type frequency was mapped to the timeline of events and announcements. Figure 2 shows the total number of post-engagements per week by type. We were interested in whether vaccine-related posts and engagement had increased over time or in relation to specific key announcements.

Figure 3 shows the total number of post-engagements related to COVID-19 vaccines compared with the combined total of all other posts. Vaccine-related posts were clearly the most common with a significant increase apparent during the latter half of the year as significant outbreaks occurred in Australia. These post-engagements peaked in February and March and again from mid-July and appeared to coincide with the announcement by Australian authorities of a vaccine for breastfeeding women, and the commencement of a significant COVID-19 wave in Australia. Interactions intensified throughout the period of the outbreak (July–Dec 2021) as people had increased questions and concerns. Other peaks also appeared to be related to official announcements, for example, the joint guidance released by the Australia Breastfeeding Association, Royal Australian & New Zealand College of Obstetricians and Gynaecologists and the New Zealand Breastfeeding Alliance. A peak between event 5 and 6 was related to a post by a state government discussing misinformation circulating online, and debunking some common myths being promulgated on social media about the COVID-19 vaccines and fertility.

6 | DISCUSSION

This article describes patterns of information shared in Australia on public Facebook pages about breastfeeding and COVID-19 over a 13-month period during the COVID-19 pandemic. When examining posts about COVID-19 and breastfeeding, the majority of posts were about vaccines and vaccination. These posts increased over time. The findings of this study provide insight into how patterns of information distribution developed overtime. Better understanding of patterns is useful and can inform recommendations on targeted communications. Our findings demonstrate that information overabundance ebbs and flows in line with information voids, events and announcements. Being able to identify information voids early can help plan health communication initiatives to meet the needs of populations.

The CrowdTangle platform is a useful resource for researchers that searches all public Facebook posts using user-set criteria.²⁴ Some other studies using Facebook data investigations during the COVID-19 pandemic have undergone different procedures including directly inserting keywords into identified public posts and groups on Facebook,³⁴ using paid services to source data and analytics,³⁵ or focusing on known pages or groups.³⁶ CrowdTangle is an easy-to-use tool, provided free for researchers that can help to navigate barriers and to identify new and emerging narratives and pages posting content of interest. The infodemic has emerged as a significant public health issue during the pandemic and social listening is the first step in infodemic management.³⁷ Developing social listening skills is an important opportunity for health promotion practitioners to be able to identify misinformation narratives in their communities and formulate responses.³⁸ Social listening should integrate a range of offline and online sources to ensure data are as representative as possible.³⁹ While there are limitations in the use of any digital platform, there are opportunities for health promotion researchers and practitioners to use tools such as these as part of their health communication, infodemic, or health promotion work.

A systematic review of social media use for health purposes identified 10 different use-cases, grouped into three categories of user-organisations, researchers and professionals and the public.⁴⁰ Health organisations used social media most for 'infoveillance' and disseminating health information and combating misinformation, while the public used it mainly to seek and share health-related information and exchange social support in online communities.⁴⁰ While in this study the highest number of posts were from non-profit Organisations, posts from personal and government pages had the highest average number of interactions per posts, with personal posts receiving the highest percentages of love reactions, and Government the highest percentage of angry reactions. These findings differ from a Malaysian breastfeeding study on Facebook during the COVID-19 pandemic that found sharing personal experiences accounted for the most content in the groups and pages they explored.³⁴ Knowing which pages and posts are more likely to attract the most interactions has important implications for information dissemination, particularly in an emergency situation.

The exclusion of pregnant and breastfeeding women from initial vaccine clinical trials contributed to confusion during the pandemic.⁴¹ This exclusion had been precautionary, to protect infants and foetuses, but events surrounding COVID-19 vaccines have led to a growing call for safe inclusion of this group in future clinical trials.^{11,41} The lack of trial data left women and their care-providers with little evidence-based information on which to base advice and decisions.¹¹ These decisions were difficult to navigate, particularly as women of childbearing age comprise a significant proportion of the health care workforce, and as such were on the frontline of the pandemic.

Inaccurate advice, confusion and misinformation can potentially deprive infants of the unique nutritional and immune-protective benefits of breastmilk. Exploration and understanding of the information sharing and reactions with regard to breastfeeding and COVID-19 in Australia is under-explored. Preliminary analysis of comments on these Facebook posts show a continuing concern throughout the year about the lack of evidence of the safety of COVID-19 vaccines for breastfeeding women. The next phase of this research will incorporate more in-depth qualitative analysis of all posts and comments using a vaccine narrative taxonomy. This will enable further examination of how narratives have changed over time.

7 | STRENGTHS AND LIMITATIONS

This study includes CrowdTangle data from public Facebook pages with administrators based in Australia. These parameters limit the ability to generalise these findings to all Facebook users, and to the population more widely. In addition, privacy of users prevents any indication of what is being shared on messenger, in closed groups or via private profiles. While this is an important privacy restriction, it does present a limitation on understanding how data are being shared that should be recognised when interpreting data. There are limitations with using any digital platform in that it only covers data from the users of that platform, only uses data that are publicly available, and only reflects data that users are willing to share in an open forum. However, Facebook is the most widely used social media in Australia, with over 90% of Australian women saying they used the platform in a recent survey²² and these results present interesting insights. A strength of this study is that to our knowledge it is the first to consider how information patterns develop over time in this priority population (breastfeeding women) during a global emergency when evidence-based advice is limited, particularly in the early stages of vaccine roll-out.

8 | CONCLUSION

These results describe the breastfeeding and COVID-19 related content shared on Facebook over a 13-month period and the associated interactions. While non-profit organisations posted the highest number of posts, users interacted more with posts from Personal and Government pages. Volume peaks in integration appeared to

map to key announcements and events in Australia, suggesting that Facebook is an important information source. Breastfeeding is an important public health issue and there has been conflicting and confusing information for breastfeeding women during the COVID-19 pandemic. Better understanding of social media usage, and the monitoring changes in usage, as an emergency unfolds can help with targeting communications. How users react to COVID-19 related breastfeeding information on social media in relation to key events is underexplored and this data and the wider project will add to knowledge in this area.

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CONFLICT OF INTEREST

There are no conflicts of interest to declare.

ETHICS STATEMENT

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

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