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Netnography: A novel methodology for nursing research

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Abstract

Aim: The aim of this paper is to critically reflect on our team's experience of using netnography to explore vaccine-hesitant parents and pregnant women, a group who have traditionally been difficult to recruit to research studies and a methodology that is underutilized in nursing research.

Design: This paper takes the form of a discussion paper that will utilize data obtained from a qualitative netnographic study. Relevant literature was searched including 2015–2023.

Method: This paper utilized data obtained from a qualitative study that used netnography as methodology and an online minable data source. Netnography is a relatively new methodology that uses the online environment to explore digital cultures and study networked society. It pays particular attention to cultural insights and conditions that impact the human experience. This methodology is particularly relevant to nursing research which is often humanistic and always conducted to ensure optimal patient outcomes.

Results: Using netnography for the first time has resulted in four main insights. These include the adaptability of the process; the creativity involved in designing the site; the ready acceptance of the site by participants and the co-creation knowledge that resulted.

Conclusions: Netnography is a creative methodology that was successful in accessing and engaging the vaccine-hesitant community, a group who are often marginalized. Netnography has the advantage of using a platform that is familiar and safe for many people and provides access to an extensive minable data source.

KEYWORDS
cyberculture, netnography, parents, social media, vaccine hesitancy

1 | INTRODUCTION

This paper critically reflects on our team's experience of using netnography to investigate the online influences on vaccine-hesitant parents and pregnant women. Netnography was first developed by Kozinets (2007) to support the use of the internet and social media in a methodological and ethical manner. While originally designed for use in marketing, it has also been employed across multiple fields including health. Netnography seeks to reveal the essence of human beings in an increasingly technological age (Kozinets, 2007).

This paper was developed using the EQUATOR guidelines and SQRQ method.

Netnography uses the principles of ethnography to conduct ethical observation in the online environment (Kozinets, 2007). According to Denzin and Lincoln (2017), the ethnographic attitude is unchanged in a digital world, which suggests that similar principles apply regardless of the field of research. Additionally, netnography is particularly well suited for researching online communications in difficult-to-access populations (Kozinets, 2007). The proliferation of social networking sites traditionally provides an abundance of opportunities for research in this space (Bayen et al., 2021; Eriksson & Salzmann-Erikson, 2013; Witney et al., 2016).

The internet and social media play a large part in our contemporary lives. Since its development in the late 1990s, social media popularity has increased exponentially. In recent years, the number of daily users has increased from an estimated 2.5 billion users in 2017 to around 4.3 billion users in 2021, with over 59% of the world's population using social media daily (Chaffey, 2022; Taylor & Pagliari, 2018). Social media platforms vary in popularity and demographics; however, the most popular platform is currently Facebook (Moseson et al., 2021). Evidence suggests that people show a preference for networks that offer a sense of community and support and provide the opportunity to connect with other like-minded people (Duchsherer et al., 2020). Therefore, people tend to remain connected to and influenced by sites that offer this kind of support (Duchsherer et al., 2020). There is also some evidence to suggest that online communities can be influential in vaccine decision-making in parents (Duchsherer et al., 2020).

A major influencing factor on vaccine decision-making is thought to be the viral spread of misinformation by a small but active anti-vaccination movement (Duchsherer et al., 2020; Vulpe & Stoian, 2018). This movement relies heavily on social media to influence the decision-making of parents. While social networking platforms have been used previously to investigate the influence of social media on vaccine decision-making, the studies by Azer and Alexander (2022); Schneider-Kamp (2022); Smith et al. (2023a) have broadened our understanding. These studies highlighted the degree of cyberbullying and misinformation that vaccine-hesitant parents are exposed to while using social media. This situation became apparent while undertaking our original research, even during the global pandemic when Facebook actively closed sites with an anti-vaccination proclivity to minimize their impact on the uptake of the COVID-19 vaccine and to encourage compliance with public health recommendations (Facebook, 2021). Vaccine hesitancy is a topic of international relevance and was declared one of the top 10 threats to global health by the World Health Organization in 2019 (WHO, 2019).

Research has played a dominant role in the evolution of nursing as a profession and is the basis for evidence-based and clinically relevant practise (Rebar & Macnee, 2011). Over the last decade, nursing knowledge has grown exponentially, and nurse researchers have expanded their repertoire of research skills. However, we were only able to locate one recent nurse-led study that adopted netnography as methodology (Björkman & Salzmann-Erikson, 2018). This paper aims to advance nursing knowledge through the discussion of an underutilized research methodology. It also critically reflects on the use of a digital environment for research, the choice of netnography as methodology and our experiences as researchers in cyberspace. Netnography combined with readily available data sources in the online environment have the potential to result in research that could advance nursing knowledge, enhance nursing practice and positively impact policy and education. Netnography has already been used with success in the tertiary sector and could be used effectively in nurse education (Eaton & Pasquini, 2020). The co-creation of knowledge present in netnography also has the potential to enhance patient outcomes.

This paper reflects on our experiences of conducting netnographic research on a vaccine-hesitant population and discusses its advantages in researching traditionally hard-to-reach populations. This paper will also explore the contribution of netnography and share the lessons learned when developing a social media platform utilized for data collection. Additionally, this paper will critically reflect on how the use of netnography impacted recruitment of hard-to-reach individuals, in this case, vaccine-hesitant parents and pregnant women, who are often marginalized, and sometimes excluded from research, and provided the opportunity for marginalized communities and individuals to have a voice and representation in academic literature (Smith et al., 2022b).

2 | BACKGROUND

Vaccine hesitancy has been described as the reluctance or refusal to vaccinate despite the availability of vaccines (WHO, 2019, 2022). Immunization is universally accepted as one of the most significant health initiatives of recent times. However, despite this, vaccine hesitancy is increasing (WHO, 2019). This includes countries like Australia where many parents have experienced some concerns about childhood immunization (Danchin et al., 2018; Dube et al., 2019). Despite significant successes with vaccines and evidence to support their safety and efficacy, anxiety and mistrust surround vaccine safety (Arthurs et al., 2021; Smith et al., 2022b; Ximena, 2019). Recent studies have drawn a link among the internet, social media and vaccine refusal (Azer & Alexander, 2022; Bradshaw et al., 2020; Jenkins & Moreno, 2020; Schneider-Kamp, 2022). Additionally, issues such as an 'infodemic' of misinformation in the online environment and exposure to conspiracy theories are influencing factors in vaccine decision-making and health literacy (Azer & Alexander, 2022; Gisondi et al., 2022; Schneider-Kamp, 2022).

As a team of nurse researchers new to the methodology, we were keen to learn from the knowledge and experiences of others who had used netnography in the last 5 years. An informal search of the literature (2010–2023), through a variety of databases including Scopus and PubMed, revealed several studies that had used netnography with a health focus. These included the investigation of parent's experiences in using baby food pouches in a parenting forum; the exploration of disordered eating topics on a website and

the study of nutrition-related messaging on a transgender social networking site (Björkman & Salzmann-Erikson, 2018; Schier & Linsenmeyer, 2019; Strand, 2022). Two studies explored vaccine and disease management issues, one which used wearable data to monitor daily symptoms, while another analysed discourses of posts on an anti-vaccination web page (Bastian Greshake et al., 2021; Vulpe & Stoian, 2018). Several studies had a broad health-related focus and included monitoring the use of conversational chatbots, mining Twitter for tweets about stress management self-care in older adults and online content about hypertension (Ashish Viswanath & Das, 2020; Jussila et al., 2022; Lawless et al., 2020; Zhao et al., 2020).

Other health-related topics included the study of patient experiences in hospital, monitoring content on a GoFundMe page for sufferers of Osteogenesis Imperfecta and exploring the online information sought by people who sustained workplace injuries (Manning Hutson et al., 2022; Suri & Verma, 2022; Tsimicalis et al., 2022). Additionally, a study by Björkman and Salzmann-Erikson (2018) explored and described the online communication of parents using a telephone advice nursing service in Sweden. The authors of this article combined netnographic methodology with thematic analysis of discussion threads located on open-access online forums (Björkman & Salzmann-Erikson, 2018). They concluded that netnography provided a new dimension for monitoring virtual discussions regarding the healthcare system in Sweden and proved to be highly valuable for adding new insights to the research. Additionally, Björkman and Salzmann-Erikson (2018) believed that users expressed their opinions more freely in an online environment than in face-to-face encounters. Three recently published papers included the work of Azer and Alexander (2022), Schneider-Kamp (2022) and (Berdida et al., 2023), all of which had a COVID-19 focus.

2.1 | The netnographic research

This discussion paper utilizes data obtained from a research project conducted between 2021 and 2022 to explore the influences on decision-making in vaccine hesitancy in parents and pregnant women (Smith et al., 2022b, 2023a, 2023b). This body of research included three components that used a combination of ethnography and netnography as methodology (Smith et al., 2022a, 2022b, 2023a, 2023b). The studies included a predominantly online survey via Qualtrics^{XM} with participants recruited via social media, specifically Facebook, a series of semi-structured interviews with 12 vaccine-hesitant parents and pregnant women and a netnographic study of online discourses on the purpose-designed Facebook page (Smith et al., 2022a, 2022b, 2023a, 2023b).

Ethics approval for all studies was obtained from Flinders University HREC No. 2464. A research-specific Facebook page, entitled 'Vaccine hesitancy in pregnancy and early childhood', with the category of Medical Research, was developed and commenced data collection in January 2021, and the page was closed in December 2021 (Figure 1). Recruitment to all studies was via paid and unpaid dissemination of content via Facebook. Like its close relative ethnography, netnography conducts research in the field, however, the netnographic field is an online digital world. At the time of our research, the global pandemic resulted in the forced closure of many Facebook pages with anti-vaccination undertones. Some sites

FIGURE 1 Facebook Page graphic.

relocated to other social media platforms under names that no longer reflected their beliefs or purpose and were neither searchable nor open to new members if located.

This was the research team's first experience conducting research in cyberspace and developing a research-specific social media site and was not without its challenges. After several initial failed attempts to connect with an established Facebook group, the decision was taken to open a research-specific Facebook Page. Facebook was chosen as the platform for this research based on the number of regular users and its' proven efficacy for cost-effective recruitment (Moseson et al., 2021). This factor was significant as minimal funding was available for this project. After considerable online searching, the team elected to create a research-specific Facebook page with the purpose of recruitment to the online survey and interview phases of the research as well as researching the influences of social media on decision-making in vaccine-hesitant parents. Hence, the 'Vaccine Hesitancy in Pregnancy and Early Childhood' page was established and served as a recruitment source for all aspects of the research as well as a data collection tool for the netnographic phase.

Netnography is not without its ethical issues. Gaining informed consent from research participants is the cornerstone of ethical research, however, netnography poses some specific ethical issues (Kozinets, 2015). Previous research has highlighted that the use of social networking sites as the focus of research presents some ethical dilemmas in terms of privacy, confidentiality and respectful representation (Golder et al., 2017; Kozinets, 2015, 2020). Concern exists about the participants' inability to provide informed consent. For this reason, netnographic research is often considered to be covert in nature, with the debate over who owns the content and whether online interactions are public or private (Munt, 2001). According to Kozinets (2015), data in the public domain could be considered a cultural artefact and therefore a public document. Additionally, a netnographic researcher has the option of being interactive in an online world or purely voyeuristic. The information given in an online environment is neither necessarily given for the purposes of research nor is consent given or implied (Kozinets, 2007). The confusion lies in the nature of the internet, which is arguably, neither private nor public (Kozinets, 2007).

The research team reflected at length on the need to conduct ethical research resulting in some discussion of how best to enhance rigour. While consent was obtained from participants in the online survey and interview phases of this research, we were initially unsure how to achieve this on the Facebook page. The decision was subsequently taken to be open about the purpose of the page. Additionally, it was agreed that the purpose of the site would be restated regularly and that any identifying information including photos, profile names or pseudonyms would not be reproduced in subsequent publications. Additionally, the site administrator and primary author of this paper would be present on the page, make regular post and not simply observe.

The purpose of the page was stated on creation and restated whenever confusion about its purpose was raised. The social networking site is a research-specific site, and this was continually restated to participants by the site administrator (primary author) through online posts when confusion became evident. The primary author acted as the site administrator. This role required initial development of the Facebook page, including artwork and establishment of the research-specific page. Several sites offer photos and artwork, some with no copyright requirements, such as Shutterstock, Canva and others. Additionally, graphics are available through many word processing software. The primary author spent time learning about the copyright requirements prior to selecting the photograph used for the site.

The role of administrator included responding to posts encouraging comments in areas that were under-addressed and moderating aggressive behaviour. Fortunately, the comments on the site, while sometimes extreme, were rarely offensive. This task was moderately labour intensive and required accessing the site daily. In addition, paid advertisements were placed on the site, raising questions and seeking opinions. Other team members provided feedback on the site and contributed to data analysis and subsequent production of the research and academic papers.

The Facebook page acted as a recruiting tool for all aspects of the research and providing an opportunity for sharing information (Figure 1). This approach led to the research team taking a more creative approach to explore the influences of social media on decision-making in vaccine-hesitant parents and pregnant women. However, in the early planning phase, the effectiveness of this method was not assured. It was uncertain whether the Facebook page would attract any interest or receive any posts, which on reflection was somewhat naive given the divisiveness of vaccine hesitancy and the popularity of social media. However, our initial concerns about how to get the page seen and followed were unfounded. This was achieved largely by Facebook support and careful selection of the metrics which would drive the dissemination of the page.

Highlights about the research and progress of the study were posted regularly along with requests for opinions and comments. Full disclosure of the researcher's presence, affiliations and the purpose of the site were made on several occasions when confusion about the role of the site became evident. On reflection, while the initial development of the page involved a steep learning curve, the final product, the amount of interest in the site and the quality and quantity of data obtained made the project worthwhile.

The first post announced the receipt of ethics approval for the study. Subsequent posts used a combination of paid Facebook advertisements and simple questions posted by the site administrator to create discussion threads. An initial paid advertisement was placed on the research-specific social networking site to seek participants for the survey and interviews and a small number of posts were initiated on the page to create discussion and to moderate responses when commentary became aggressive or argumentative. This resulted in interest from across Australia and internationally. Subsequently, participants 'followed' the page, and this resulted in ongoing passive recruitment. The page very quickly became an opportunity for both pro- and anti-vaccination advocates to express their beliefs, and at times, became highly emotional. Posts and

memes as well as general discussion poured into the site on a 24-h basis and from diverse geographical locations. Additionally, an infodemic of misinformation and conspiracy theories were posted combined with emotional posts, all with the potential to influence and alienate vaccine-hesitant parents.

The significant amount of commentary posted on the site became an invaluable example of the types of discussions that take place in a digital environment where people feel safe to express strong beliefs. While initially slow to attract attention, the Facebook page subsequently became a platform for both pro- and anti-vaccination advocates to express their beliefs, and at times requiring mediation from the site administrator, a member of the research team and primary author of this paper. Some contributors were regular posters and most had strong views.

During the 12 months the site was live it received over 15,000 posts, memes and other contributions, and achieved 13,569 'learn more' clicks that linked participants with the online survey. During only 1 month of data collection, the social networking site received 2556 posts and 1332 people engaged with the page in the period between 3 and 30 August 2021. While all paid advertising ceased at this time, the page continued to receive views, likes and comments until it was closed in December 2021. The research team learned a great deal about the business that is social media and developed skills in graphic design, site management and virtual crowd control.

2.2 | The analysis

Netnography can take various forms and adopt differing analytical and interpretive methods. Analysis can take the form of content analysis or thematic analysis, either manual, via computer-assisted qualitative data analysis (CAQDAS) or a combination of both. In this study, data were extracted from the social networking site by taking screenshots of posts and subsequently transcribing data into a Word document which was collated and uploaded to NVivo. Data scrapers exist which can aid this process (Kozinets, 2015). Data scraping is a process whereby data can be imported from websites into a spreadsheet. However, there can be no guarantee that the dataset obtained using this method is valid (Boegershausen et al., 2022). For this reason, the authors elected to take a more hands-on approach to ensure rigour and to get close to the large amount of data collected. The large amounts of posts and memes applied to the Facebook page were analysed using thematic analysis assisted by a combination of manual and NVivo software (Braun & Clarke, 2006). An inductive approach was adopted to analyse the posts and visual elements (memes) as this research was building new knowledge rather than proving an existing theory (Azungah, 2018). The results from the original study are currently under peer review and have not yet been published.

Data collection for this research took place during the COVID-19 pandemic, and at a time when the COVID-19 vaccines were being released to the public. This was a time when many nations were enforcing work-from-home requirements and social isolation restrictions. Therefore, it was not unexpected that emotions were high at this time, which may have contributed to highly emotive posts and diverse opinions being shared on the site in the form of posts and memes. Three major themes emerged from the data including: (i) vaccine safety concerns; (ii) the emotional debate; and (iii) COVID-19-specific issues. The netnography showed that vaccine safety concerns were a major influence in vaccine decision-making and appeared as a regular and emotive feature in Facebook posts and interactions. Considerable distrust was also expressed about the pharmaceutical industry. One participant posted 'Nobody should put this toxic garbage into their child, why does the body need poison?'. While some degree of anti-vaccination sentiment was expected on this site, the degree of vaccine safety concerns and distrust was clearly and graphically demonstrated on this page. The emotional debate underpinned the online chat which also used graphic emotive and inaccurate images either with or without explanation.

Pregnancy was an important focus of the original body of research, and the Facebook page received a large volume of negative commentary about the perceived side-effects of immunization in pregnancy which ranged from perceived long-term health complications to miscarriage. For example, one participant stated 'Don't get jabbed when pregnant. No data please keep them safe'. These posts largely followed the 'my body – my choice' argument while others had generally anti-government and anti-pharmaceutical industry sentiments. Additionally, as this research took place during the COVID-19 pandemic, a large amount of COVID-specific comments were posted.

To focus the argument, several questions were posted by the research team to illicit participant thoughts on subjects that had not previously been addressed. These included, but were not limited to, the following questions: 'How do you feel about COVID-19 vaccines being a condition of employment in some workplaces?' Responses to this question were emotive and, in some cases, aggressive. An example of subsequent rhetoric was 'A violation of human rights. Submit to medical treatment or live-in poverty. The vaccine is still experimental'. However, some participants simply did not believe that COVID-19 existed (Blinded for peer review).

The concepts of co-creation, co-design and co-production, although different, all involve some form of collaboration between researchers and community members or other stakeholders (Slattery et al., 2020). Co-creation of knowledge or the joint production of knowledge with stakeholders has been used previously in addressing issues relating to vaccine hesitancy (Vargas et al., 2022). Many countries have adopted the principle of active involvement in research, however, there are different approaches and different levels of involvement in the co-creation of knowledge. For example, co-design has been defined as any meaningful collaboration or end-user engagement in research (Slattery et al., 2020; Vargas et al., 2022). Additionally, debate has taken place about what should be considered meaningful involvement (Locock & Boaz, 2019). Each year millions of dollars are spent on research which fails to involve end-users in any meaningful way (Slattery et al., 2020). Additionally, while

widely used, there is evidence to suggest that co-design is often neither described accurately nor evaluated.

The co-creation of knowledge value added to the original project. This was achieved by encouraging participants to respond to questions and contribute to discussion free from restrictions. This approach resulted in the creation of a safe space that encouraged the free flow of discussion, the sharing of beliefs and the generation of ideas, as evidenced by repeat posters on the site. Given that this site was created from nothing with no followers and only very limited finances to promote its presence, the interest in the site was phenomenal and the contribution from participants grew exponentially over the 12 months it was live. Only 13 paid advertisements were purchased in this time and followers posted large amounts of posts and memes from both pro-and anti-vaccination perspectives. The researchers' role in co-creation of knowledge was to provide the platform and to guide the discussion to areas of interest. The paid advertisements took the form of questions such as 'If you are in favour of vaccines, can you tell me what concerns you about people who elect not to vaccinate?'. These were designed to prompt discussion and ensure knowledge was created across all areas of interest to the study.

The choice of netnography as methodology in this research was an obvious one for several reasons. There is evidence that online communities provide a supportive environment for people with specific health issues or beliefs (Lawless et al., 2020). Additionally, netnography has been demonstrated to be a valuable tool for exploring virtual communities and cybercultures (Lawless et al., 2020). Studies of online communities can be less obtrusive and have demonstrated insight into consumer choices as well as providing valuable insight into their beliefs and preferences while providing an opportunity for incorporating the co-creation of knowledge into the project (Lawless et al., 2020). The use of a purpose-designed social media page provided unlimited access to the information, misinformation, bullying and conspiracy theories provided by community members, which subsequently influence the choices that parents make. However, inherent in any ethical research is the need to intervene when instances of bullying were detected. A very general statement about what is appropriate online behaviour was posted which effectively moderated the online tone. Finally, as community members were the only source of this information, co-creation of knowledge was employed throughout this aspect of the research project. Subsequently, the findings of this research accurately represented the voices of this seldom-heard and often marginalized group.

Reflecting on the choice of methodology for this research resulted in the following insights: the adaptability of the process; the creativity involved in designing the site and the co-creation of knowledge that resulted and the ready acceptance of the site by participants. In researching recent research projects that used netnography as design, the adaptability and flexibility of the methodology and the multiple options for data collection became evident. Despite the research team being new to the netnographic methodology, data collection in cyberspace and the co-design process, we were impressed with both the ease of developing the Facebook site and the adaptability of the data collection process. In this research, the aim was to design a site that would resemble traditional sites which had been forced to close or relocate due to the COVID-19 pandemic. We wanted to provide a natural feeling site where opinions could be shared and discussions take place.

While not initially experienced in website design or in developing a Business Facebook page, the team has learnt a great deal about what is required to develop a successful Facebook page. Instructions are readily available online and support can be obtained through Meta and the Business help centre (Meta, 2023). There is a great deal of support for advertisement creation and online training is available. This process worked well and resulted in both the high levels of acceptance of the site and the sharing of large volumes of information and opinions and many memes like the ones above.

Creating the initial opening page while relatively simple did require a degree of creativity, however, far less than was initially anticipated. The photo used was publicly available and free of copyright restriction, eye-catching and represents the site well. Considerable thought went into the final design and many iterations prior to settling on the final layout. The initial design was simple with the specific focus of recruiting parents to the research project which included an online survey, semi-structured interviews and netnographic study.

Apart from the collection of relevant, emotive and graphic data, a further advantage of using a Facebook page as the primary data collection point meant that knowledge was co-created by those who actively participated through posts and memes. The initial few posts began slowly in response to paid advertisements for participants, however, discussions developed and emotions soon became evident. Subsequent posts directed discussions into areas that were previously under addressed. At no time did the administrator express an opinion, however, at one point it became necessary to moderate the intensity of the posts as they were becoming too aggressive.

Consideration was given to the ethics of intervening at this time. It was clear that passion was running high in the discussions, and it was possible that intervention may have interrupted the free flow of discussion. However, some participants were being singled out and mocked for their beliefs to the point where moderation from the page administrator was deemed necessary. This was to ensure that all participants felt free to express their beliefs and opinions without criticism, mocking or aggression. For research to be of value, community participation is vital and this social media site acted as both a recruiting source and a place where parents could share their feelings about immunization. The metrics chosen allowed the research team to focus the site on parents of young children both across Australia and internationally to ensure a broad geographical and socioeconomic audience.

3 | DISCUSSION

By using netnography, this research attempted to demonstrate the complex nature of seeking immunization information in an online environment with the express intention of gaining a deeper

understanding of the influences of cyberculture on vaccine decision-making in parents. To our knowledge, this is the first study to use netnographic methodology combined with data collection on a purpose-designed Facebook page to mine for data. Previous research has used similar methodology and methods to conduct research in cyberspace including the study by Jussila et al. (2022) whose research successfully mined and mapped Twitter to better understand stress management practices. Additionally, studies by Jenkins and Moreno (2020) and Bradshaw et al. (2021) have also used social media to investigate vaccine hesitancy using both content and discourse analysis to evaluate parenting blogs and posts on a Facebook group. Both studies were conducted prior to the COVID-19 pandemic and concluded that these media had a negative impact on vaccine choices.

Our research which was conducted during the COVID-19 pandemic and at a time when vaccines were entering the market demonstrated the presence of both strong anti-vaccination and pro-vaccination sentiments posted on the Facebook page. The netnographic study found that vaccine refusal was often driven by vaccine safety concerns and a deep-seated mistrust in the pharmaceutical industry. Vaccine decision-making was also driven by exposure to conspiracy theories and other misinformation often accessed online. This was evidenced by the posters with anti-vaccination beliefs who relied predominantly on inaccurate and highly emotive discourses, memes and conspiracy theories. These contributors posted an 'infodemic' of misinformation about the perceived 'unsafe' nature of vaccines which was often presented in a highly credible way, with the intention of instilling fear and doubt in the vaccine hesitant. Similarly, misinformation was evident in discussion threads that suggested incompetence in the pharmaceutical industry in general and in the safety of pregnancy and COVID-19 vaccines. While this result was not unexpected, the degree of distrust and animosity shown in the posts and memes was consistent with findings from Bradshaw et al. (2021); Jenkins and Moreno (2020).

The netnographic study demonstrated that misinformation, cyberbullying, conspiracy theories and overt aggression proliferated, even in a controlled environment, such as the one our research team created. The visual impact of the memes combined with the 'plain speaking' nature of the commentary on Facebook had significant impact on the research team and it can be imagined how this level of emotion would influence the undecided or conflicted parent. This was far more evident during the netnographic phase of this research as opposed to the online survey where responses can be brief and somewhat sanitized, or the interviews where participants reflected on their experiences, however, words are seldom as dramatic as pictures. One factor revealed in this research was the degree of animosity, aggression and vitriol evident in the posts which has not been highlighted in previous research. This suggests that participants are more likely to share their feelings and emotions in a medium where they feel comfortable, such as social media. The overall impact on parental decision-making was not quantified in the research, however, the netnographic study identified that cyberspace has the potential to adversely influence the decision-making of undecided or conflicted parents; further research is needed to confirm these results. This should ideally take place in a post-pandemic world if such a thing is possible and employing netnography while using data obtained from a social media site that has not been artificially created. The use of netnography as methodology contributed to the research by adding a perspective of cultural understanding, a representation of identity and imagery in the form of memes that embody the online experiences of the vaccine hesitant (Kozinets et al., 2018).

There were significant advantages in the adoption of netnography as methodology combined with the use of a Facebook page as a data source. The Facebook page provided the opportunity for information seeking and sharing, with an option to participate or to simply observe. This method of data collection had the advantage of providing a platform for parents with both pro- and anti-vaccination sentiments to share and seek information in an environment that felt familiar and safe. This familiarity resulted in the collection of rich, descriptive and often graphic data which provided a clear and often surprising representation of the experiences of a parent in cyberspace. This method of recruitment and data collection proved to be especially useful during the global COVID-19 pandemic, when person-to-person contact was not only difficult but inappropriate given the risk of infection and difficulty associated with obtaining ethical approval for such a project.

Additionally, this method of mining a social media platform ensured the recruitment of an otherwise difficult-to-reach population. Vaccine-hesitant parents' voices are also seldom heard in research and this study was able to narrate their experiences in the online environment. This method ensured that large volumes of data were collected and analysed from both pro- and anti-vaccination contributors and the use of the Facebook site ensured that participants were also recruited for other aspects of the larger research project including the online survey and semi-structured interviews.

The use of this method of data collection resulted in a high level of engagement on the Facebook pages and considerable interest in the topic of research. This could be attributed to the timing of the study which took place during pandemic restrictions when interest in vaccines and vaccination was peeked and opinions diverse and often extreme. This research demonstrated it was possible to capture information from people from broad geographical locations as well as access participants who were marginalized and who are often reluctant to participate in research. Data were able to be collected from across Australia and internationally, thereby providing a truly global perspective on the problem of vaccine hesitancy. There was the added advantage of attracting participants with both pro- and anti-vaccination sentiments, which resulted in data with differing perspectives and subsequently resulting in robust discussions. In terms of the purpose of this study being to gain a deep understanding of the influences of social media on vaccine decision-making, netnography proved to be an ideal platform. Netnography combined with data mining from a social networking site proved ideal for research where a naturalistic or humanistic approach is a priority.

A possible limitation of the research was the timing of data collection, which took place during a global pandemic. This required the

online environment to be artificially created because of the forced closure of social networking sites with anti-vaccination sentiments which were a cause for concern during the pandemic. While the lack of access to existing anti-vaccination social networking sites was an initial limitation and required the development of a research-specific site, in the long term this proved to be advantageous. As a result, the online participants held either pro- or anti-vaccination beliefs, resulting in robust debate from diverse viewpoints. However, because of the timing of the study, the existence of the global pandemic understandably directed much conversation to developing COVID-19 vaccines. While this concept was originally outside the scope of the research, the volume of COVID-19-specific commentary resulted in its subsequent inclusion in the study.

A further limitation of this study may be the use of only one social media platform (Facebook). This platform was chosen as it is the most popular and with the most regular users. It was also a cost-effective choice. However, it is possible that by using an additional platform such as Reddit or Twitter, the study may have attracted a more diverse population of parents.

Consideration should also be given to the issues of ethical research in cyberspace. Despite the popularity of social media, conducting research in this space is still subject to ethical approval and privacy. Consent is an important aspect of any research and participants on social networking sites may be unaware that data are being collected, hence unable to make a conscious choice to participate in a study or give informed consent (Buck & Ralston, 2021). The Association of Internet Researchers recommends obtaining informed consent when conducting internet research where possible, however, this presents some challenges in social media where participants are often using pseudonyms and may or may not respond to requests for permission to use data.

4 | CONCLUSION

Netnography can take many forms, use multiple methods of data collection and adopt differing analytical and interpretive methods. However, as a form of qualitative inquiry with its roots in ethnography, netnography can also adopt a humanist approach while relying on field notes, introspection and contemplation (Kozinets, 2015). Analysis can be manual or use CAQDAS or a combination of both. Netnography has the advantage of using a platform that is familiar and safe for many people. Facebook pages provide the opportunity for information seeking and sharing as well as an opportunity to participate or to simply observe. This medium proved to be successful in accessing and engaging the vaccine-hesitant community, a group that would not usually participate in research. The findings of vaccine safety concerns combined with distrust in the scientific and pharmaceutical community have successfully depicted influencing factors in vaccine decision-making. The emotional debate has defined the degree of animosity and misinformation which parents are exposed to in cyberspace. Finally, the COVID-19-specific issues which were evident on the Facebook site have highlighted the distrust in COVID-19 vaccines and disbelief in the existence of a pandemic. Finally, this methodology and method of data collection resulted in the recruitment of participants from diverse backgrounds whose location was not constrained geographically. This study provided a platform for parents with both pro- and anti-vaccination beliefs to share their thoughts, express their concerns and respond to discussion threads. This study demonstrated that social media has the capacity to provide an 'infodemic' of misinformation which may influence the decision-making of vaccine-hesitant parents. A surprising aspect of this research was the degree of aggression and vitriol that vaccine-hesitant parents were exposed to in cyberspace. This 'infodemic' was shown to cause fear and anxiety in vaccine-hesitant parents. The state of social networking sites during the global pandemic, although not a reflection of the internet under non-pandemic conditions, provided a somewhat modified example of what parents could encounter when information seeking in an online environment.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*): (1) substantial contribution to conception and design, (2) acquisition of data or (3) analysis and interpretation of data.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known conflict of interest or competing financial interest or personal relationships that could have appeared to influence this paper.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

Data available on request from the authors.

IMPLICATIONS FOR THE PROFESSION

This paper reports on the use of netnography in investigating the online influences on decision-making of vaccine-hesitant parents and pregnant women. The purpose of this paper was to share our experiences of using this novel methodology for the first time. The rapid increase in the use of the internet and social media provides a wealth of opportunity and minable data for nurse researchers. As a team of nurse researchers, we found the process to be clear, creative and adaptable. This methodology has clear implications for the nursing professions ranging from access to large amounts of minable

data to the opportunity to seek opinions and provide feedback in real time at minimal cost. It was also an excellent way of incorporating co-creation of knowledge into the project.

PATIENT OR PUBLIC HEALTH CONTRIBUTION

Members of the public were involved in the netnographic study by providing online data and the co-creation of knowledge.

DATA SOURCES

English language literature was sourced from the following databases: CINAHL, SCOPUS and Google Scholar including data from 2000 to 2022.

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