"BLURRED BOUNDARIES": WHEN NURSES AND MIDWIVES GIVE ANTI-VACCINATION ADVICE ON FACEBOOK

ABSTRACT

Background: Nurses and midwives have a professional obligation to promote health and prevent disease, and therefore have an essential role to play in vaccination. Despite this, some nurses and midwives have been found to adopt an anti-vaccination stance and promulgate misinformation about vaccines, often using Facebook as a platform.

Research question: This paper reports one component and dataset from a larger study; "the positives, perils and pitfalls of Facebook for nurses". It explores the specific issue of nurses and midwives who take an anti-vaccination stance, deemed to be unprofessional by crossing professional boundaries, and by providing medical information on Facebook that is not within their scope of practice.

Participants: Data were collected via an online worldwide survey to nurse and midwife participants, distributed and 'snowballed' through relevant nursing and midwifery groups on Facebook. In total 1644 Registered Nurses, and Midwives, and Enrolled Nurses worldwide attempted the online survey. Semi-structured interviews occurred with 17 participants in Australia.

Ethical considerations: Ethical processes and procedures have been adhered to relating to privacy, confidentiality and anonymity of the participants.

Findings/results: A mixed-methods approach was used including descriptive and content analysis of the quantitative survey data and thematic analysis of the qualitative interview data. The main theme '*blurred boundaries'*, was generated which comprised three sub-themes: '*follow the science, 'abuse of power and erosion of trust'* and '*the moral and ethical responsibility to safeguard public health'*. The results offer an important and unique

understanding into how nurses and midwives interpret the conduct of fellow health professionals as unprofessional and crossing the professional boundary if they used Facebook to promulgate anti-vaccination messages as online medical advice.

Conclusion: There are many positives and negatives for nurses and midwives associated with using Facebook. In this paper, the theme '*blurred boundaries'* offers an overall understanding of how nurses and midwives interpret the behaviour of their colleagues who espouse ant-vaccination sentiment giving medical advice online .

Key words

Anti-vaccination, misinformation, nurses and midwives, Facebook

BACKGROUND

Vaccination has made an enormous contribution to global health. Nurses and midwives have a role to play in public health activities such as vaccination programs, infectious disease surveillance, and to educate the public about the benefits of vaccination. Such education could be instrumental in allaying fears and clarifying misinformation. The SARS Co-V2 (COVID-19) pandemic has had a huge worldwide public health impact. It would be anticipated that the commencement of the world-wide rollout of the COVID-19 vaccine would be received favourably by frontline health workers; however, while this is true for many, it is not universal. Health care workers have been given priority access to the vaccine, and while many have embraced the vaccine, others have refused. Research by Altman [1] found that 29% of healthcare workers were "vaccine hesitant," and were worried about side effects. Vaccine hesitancy, the reluctance or refusal to vaccinate, was among the World Health Organization's (WHO) top 10 threats to global health in 2019 [2].

The purpose of this paper is to outline the findings of a larger study that explored "the positives, perils and pitfalls of Facebook for nurses". It will focus on an exploration of, and discussion about, nurses and midwives who consider themselves to be against vaccination (referred to as anti-vaxx), and who give unqualified medical advice on Facebook about vaccines, including why they should be refused. This paper is timely as the COVID-19 vaccine has begun to be rolled out, and qualified nurses will be expected to vaccinate and be vaccinated. It is recognised that there is a lack of equity with many lower income countries form the Global South facing challenges with access to the COVID-19 vaccines [3].

Twenty-three years ago in 1998, The Lancet published an article [4] about a small study that "has become one of the most notorious and damaging pieces of research in medicine" [5].

The study, led by Andrew Wakefield (since discredited and has lost his medical license), was a series of case-reports involving 12 children, and while considering their medical histories, the researchers concluded there was a link between the measles, mumps, and rubella (MMR) vaccine and autism [4, 6]. In the publications, Wakefield et al. [4, 6] also proposed a link between the MMR vaccine and a new inflammatory bowel syndrome, 'autistic enterocolitis'. It is noteworthy that autistic enterocolitis and autism are two different entities, and giant unsubstantiated leaps were made by Wakefield and his followers from autistic colitis to autism as a developmental disorder.

In 2000, Wakefield published another article [7] claiming that the MMR vaccine was introduced into mass vaccination programs without sufficient safety testing [8. It was not his publications that ignited media attention, it was the teleconference by a medical charity that promoted gastrointestinal health, who gave Wakefield the opportunity to outline his concerns about the MMR and the connection between the vaccine and autism-colitis [8]. Although Wakefield [5] tried to defend his research, the study and its results were thoroughly debunked, and The Lancet retracted the paper [5]. The study was found to be fraudulent, however, it took 12 years for The Lancet to retract the paper. Despite the article being retracted the damage had been done, and as suggested by Belluz [5], despite the false data and erroneous conclusions in the research being rejected by the scientific community, it helped fuel a dangerous movement of anti-vaxxers around the world.

The power of social media is amazing, and provides a platform for people to engage, share and learn. For the purpose of this paper and the research that it originates from, Hartshorn's [9] differentiation of the terms 'social media' and 'social networking' will be used. Social networking is an act of engagement or using social media, while social media is the way to transmit and share information with an audience via the chosen platform such as Facebook

[9]. Social media has an advantage over mainstream media by facilitating public participation in science and health communication. The sheer number of Facebook users make it the main channel of communication during a health crisis and emergencies [10]. However, Facebook groups opposing vaccination are prevalent and are a platform where anti-vaccine activists spread their messages questioning the legitimacy of science [11]. These are problematic because individuals turn to Facebook groups for vaccination advice and have been shown to influence whether people vaccinate [11]. It is troubling that Betsch et al, [12] found a 5-10-minute visit to an anti-vaccination site was shown to increase perceptions of vaccination risks, decreasing an individual's intentions to vaccinate. Moreover, an analysis of the vaccination pages on Facebook found that Facebook may play a large role in the propagation of vaccination misinformation, by allowing the anti-vaxx groups to promulgate anger, fear and scepticism regarding vaccinations [13]. Furthermore, it was concerning that although information dispelling vaccinations myths was readily available, there was less interest in this information compared to the misinformation on the anti-vaxx pages. Anti-vaxx Facebook sites were analysed by Smith and Graham [14] who found that participating in a community of like-minded others reinforced anti-vaxx beliefs, with participants being active across several Facebook groups and pages. They liked and actively commented on several anti-vaxx pages thus creating a 'bubble effect', making the network appear larger than it actually was, which resulted in reinforcement of anti-vaxx sentiment [14].

Facebook is now considered to be the main vehicle by which anti-vaxx groups spread lies and misinformation [14]. Nurses and midwives are frequently found in anti-vaccine groups on Facebook. Within the bubble of closed Facebook groups, members warn about alleged dangers of vaccinations, citing pseudoscience and conspiracy theories [15]. Many nurses and midwives in the groups shared their delight at how they have influenced their patients and parents to avoid vaccines. Facebook pages designed to dispel the fear-mongering of the

anti-vaxx sites include ‘Refutations to anti-vaccination memes’, ‘Stop the anti-science movement’, and ‘Provaxxer’; however, two groups are of specific concern, namely; ‘One Vaxxed Nurse’ and ‘Nurse Doodle’ because these are Facebook groups run by nurses to educate the public about vaccination with the intention to prevent misinformation.

In Australia for example, as indeed in many other countries across the world, nurses and midwives are trusted health professionals. However, nurses and midwives in Australia have been disciplined by their regulatory body the Australian Health Professionals Regulatory Authority (AHPRA) [16] for posting anti-vaccination sentiment on Facebook and other social media platforms. This becomes even more problematic when the public seeks advice from ’trusted’ health professionals and are instead given information that promotes anti-vaccination sentiment that lacks scientific validation. Complaints have been made and the Nursing and Midwifery Board of Australia (NMBA) [16] became aware that “a small number of registered nurses, enrolled nurses and midwives who are promoting anti-vaccination statements to patients and the public via social media which contradict the best available scientific evidence”, and have issued a position statement on nurses, midwives and vaccination. NMBA [16] have a policy about the use of social media that states that health professionals are not to present “information that is false, misleading or deceptive”. Regulatory organisations are designed to keep the public safe by ensuring that nurses and midwives take their role in health promotion and disease prevention seriously, and they will take action against ant-vaxx nurses/midwives. This was the case in the UK where a nurse who denied the existence of COVID-19 and ‘actively discouraged people from wearing masks, adhering to social distancing, and taking vaccinations’ was removed from the UK nursing register [17].

Misinformation and anti-vaccination sentiment posted on Facebook have the potential to impact on the health of the community, especially babies and children (Name of the authors of this paper) [18]), and is considered by regulatory authorities to be poor professional conduct. (Name of first author) has outlined how nurses' online behaviour and how it can impact their professionalism [19].

RESEARCH QUESTION/AIM/OBJECTIVES

The findings presented in this article are part of a larger study that has explored (the name of the thesis) related to the use of Facebook for nurses. This paper takes part of the findings from this larger study to discuss the issues around anti-vaxx sentiment from nurses/midwives.

Aim

The purpose of the research was to investigate the positives, perils and pitfalls of Facebook use for professional nurses and midwives, and discover, describe and explain how nurses/midwives can leverage the benefits of Facebook and avoid the pitfalls.

The aims and objectives of the study were:

- To explore the positive and negative aspects of Facebook use for nurses/midwives
- Understand how nurses/midwives are managing the challenges and explore how nurses/midwives can leverage the benefits of social media for their professional lives

Conceptual framework

The conceptual framework of the larger research is aligned with the work of Irvin Goffman about self-presentation [20]. There is a link between identity and self-presentation. In relation to the current research, a nurse's/midwife's individual identity on Facebook is seen a function of his/her interaction with others through an exchange of information. Identity is constructed through an understanding of the projection of the self to others. Establishing social identity becomes closely aligned with Goffman's [20] "front" or "that part of the individual's

performance which regularly functions in a general and fixed fashion to define the situation for those who observe the performance". The “front” represents the setting, appearance and manner for the social role adopted by the actor (nurse), who is expected to fill the duties of the social role and communicate the activities and characteristics of the role to other people in a consistent manner. Using Goffman’s [20] work it can be theorised that when a nurse/midwife posts something that is considered inappropriate by his/her Facebook friends they are discredited, resulting in alienation and stigmatisation because of reduced social exchange [21]. The professional identity and reputation of the nurse/midwife can be damaged if professional consequences result from the Facebook post, such as referral to the regulatory body.

RESEARCH DESIGN

A mixed methods design was adopted for this study, utilising an online survey to examine the positive and negative aspects of Facebook use on the career and reputation of professional nurses/midwives. The closed and open-ended questions in the online survey were constructed after searching the literature for the positive and negative aspects of Facebook use for health professionals. A Facebook account was needed to be eligible for participation in the research. It is noteworthy that there were no specific questions in the online survey or asked during the interview that addressed anti-vaccination sentiment. This online survey was administered via Survey Gizmo ® followed by in-depth semi-structured interviews via Skype ® to enable further exploration. These were recorded and transcribed.

Recruiting for research is complex with strict requirement criteria imposed on the researcher and participants. Facebook is no longer considered to be a new way of research participant recruitment, with many authors documenting their experiences and giving advice about how to protect human subjects [22, 23, 24, 25]. Facebook is now considered to be a useful contemporary recruitment tool, and this is related to the sheers number of participants that

Facebook can reach. In 2021 Facebook is the leading social media platform and this is why it has been chosen as the social media platform to be researched,. It has 2.80 billion monthly active users, with 1.84 billion users visiting the site on a daily basis. Ninety wight percent of Facebook users access the social media platform via mobile phones, and Facebook users spend 19.5 hours per month using the Facebook app. Sixty five percent of Facebook users are under 35 years of age [26]. It stands to reason that when researching Facebook, it would seem the most appropriate recruitment tool.

Demographic details were sought in order provide a profile of those nurses and midwives who participated, their years of experience and country of registration. The survey also asked about Facebook usage and experience in a professional setting, use of smart phones and if a social media policy existed in the workplace. Facebook was also the chosen method to recruit participants. There are over 1000 nursing/midwifery organisations on Facebook. The lead researcher contacted selected Facebook group's administrators who then sent the survey via a link to their members.

Snowball sampling is a method of convenience sampling and a recruitment technique where research participants identify other potential research participants [27]. For the purpose of this online Facebook research, snowball sampling is a chain referral technique that accumulates research data by relying on already existing social structures [28]. It is a technique for finding research participants. Snowball sampling is invaluable when seeking participation from populations with specific characteristics [27].

Survey participants who had experience with inappropriate Facebook posts in their professional lives, if they indicated this in their survey, were asked if they were willing to be interviewed via Skype. Semi-structured interviews were utilised, and the data from the online

survey formed the basis of some of the questions. The semi-structured interviews provided the participants with some guidance on what to discuss, however they also allowed the interviewer or interviewee to diverge in different directions order to pursue an idea or elaborate on information in more detail [29]. The sample for the interviews included:

- Twelve nurses who had negative experiences with posting on Facebook – with personal or professional consequences. At the end of the survey, they had the opportunity to self-identify and contact the researcher if they were willing to be interviewed.
- Five professional nurses who use Facebook in a professional capacity with positive results.

Mixed methods research is appealing because it combines the power of stories and the power of numbers [30]. An abundance of guidance exists for assessing rigour in quantitative and qualitative methods individually, however there is little direction for assessing rigour in mixed methods research. In mixed methods research, researchers should be transparent in their descriptions of the research process (providing thorough details of data collection, analysis, interpretation and integration) so that readers can judge the quality of the research [30]. Reflexivity is part of being transparent, and the first author kept a journal and documented all aspects of the research process. The integration of data is important in mixed methods research, and triangulation describes the process of studying a problem using different methods to gain a more complete picture. Triangulation can increase the credibility and validity of research findings [30, 31]. In mixed methods research, interpretations should be based on the combined strengths of both sets of data, and inferences should be made based on the research question [31].

ETHICAL CONSIDERATIONS

This research project was approved by the (Name of University) Research Ethics Committee (*** Ref No. **********).

Many researchers have now used Facebook to recruit research participants [22, 23, 24, 25], however the ethical issues are still emerging. Privacy and confidentiality are the two most cited ethical issues associated with researching Facebook account holders [32]. Social media can blur the boundary between public and private; however, Facebook can be used as part of an ethically sound research process if the benefits of the innovative method outweigh any potential burdens to privacy and confidentiality [33]. Anonymity is also considered an important ethical issue and was ensured by not collecting any personal data and aggregating the data. The researcher had no contact with the participant's Facebook site; permissions were granted via the site's administrator. A numbering system was used for the surveys and any qualitative data.

Survey Gizmo is a secure website, and for privacy reasons secure websites are preferred over an email attachment [34]. Survey Gizmo gives researchers the opportunity to disable cookies to increase anonymity. Cookies are used to track users' use of websites and gather personal websites [35]. However, in this research the cookies in Survey Gizmo can be useful because participants could start the questionnaire but complete it later, and this potentially improves the completion rate [35]. Communications are protected by using both server authentication and data encryption, ensuring the user data in transit is safe, secure, and available only to intended recipients. Data portability means that data can be exported from the Survey Gizmo system so that it can be backed up by the researcher. Survey Gizmo retains data for as long as the

researcher has an account with it, and it states that data that is deleted from its servers may remain as residual on offsite backup media for up to approximately 12 months afterward.

Consent was sought and received from all participants in the study and survey participants were asked to read the information about the study and click 'agree to participate' before they could proceed. The interview participants completed a consent form after reading the information sheet.

DATA ANALYSIS

In total 1644 Registered Nurses, and Midwives, and Enrolled Nurses worldwide attempted the online survey. There were 1100 (66.9%) completed surveys and 54 partially (33.1%) completed surveys. No surveys were disqualified. There were 1200 pages of textual data associated with the research. The most appropriate approach to analyse data gathered by a survey is the generation of descriptive statistics. Descriptive statistics is the term given to the analysis of data that helps describe, show or summarize data in a meaningful way allowing simple interpretation of the data [36].

Content analysis was used for the open-ended questions from the online survey in order to determine the issues of most concern, used also as a data reduction technique, for exploring large amounts of text to determine trends, patterns of words, their frequency and relationship [37]. With over 1200 page of textual data, content analysis was useful in this research because it allowed inferences to be made which could be supported by the other methods of data collection. The first process was dividing the responses into positive and negative aspects, in keeping with the greater research focus. Thematic analysis was undertaken on the interview data. A theme "captures something important about the data in relation to the

research question and represents some level of patterned response or meaning within the data set" [38]. Issues related to anti-vaxx nurses and midwives was part of the negative aspects identified in the content analysis and formed a sub-theme, and the theme under which this paper is derived is poor professional behaviour.

FINDINGS/RESULTS

1644 Registered nurses/midwives attempted the online survey. The average age of Registered Nurses was 44.1 years, Enrolled Nurses was 46.3 years and midwives were 48.8 years. The percentage of those aged over 50 years was 37.3 for Registered Nurses, 47.7 for Enrolled Nurses and 55.6 for Midwives (AIHW 2016). The number of years as a registered nursing or midwifery professional ranged between one year and fifty years. This represents a vast range of experience. Ninety-three-point three percent (93.3%) of the 1514 respondents were female.

While it is clear that the survey had a reach world-wide, it is not unexpected that the majority of the total respondents who answered this question (1514) were from Australia (1185 or 78.3%), The United Kingdom (172 or 11.4%), New-Zealand (62 or 4.1%), the United States of America (41 or 2.7%) and Canada (22 or 1.5%). The total was 1482 or 98%, leaving 32 or 2% for the other countries. These results are not surprising given that the survey was in English, and was directed to only English-speaking Facebook nursing and midwifery groups.

Two of the main behaviours that were considered to be unprofessional by the nurses and midwives in the current study were giving medical advice for which they were not qualified and the propagation of anti--vaxx sentiment on Facebook. Furthermore, two issues emerged in relation to professional boundaries and professional conduct / behaviour of the nurse/midwife. Professional boundaries separate therapeutic behavior from non-therapeutic behavior. The professional boundary is the limit to the relationship of the nurse and patient/client which allows for safe and therapeutic intervention [39].

QUANTITATIVE DATA

Table 1 outlines the descriptive analysis of the survey questions. For questions 1 and 2 respectively, 821 (71%) had seen examples of what they would consider to be a breach of online professional behaviour and 650 (56.3%) had heard of or read of breaches of professional boundaries on Facebook. Question 3 then asked why these constituted a breach which had 523 responses. A content analysis of these responses indicated 182 (34.8%) that giving medical advice or taking an anti-vaccination stance constituted a breach of professional boundaries. Question 4 had 1057 respondents with 606 (57.3%) stating they had read in the media or other literature about breaches of professional behaviour on Facebook. Of these 606 respondents, 267 (44%) offered examples of situations they had seen. Question 6 had 267 respondents, with 133 (49%) having read about nurses or midwives being censored or having their employment terminated because of their anti-vaccination sentiment.

QUALITATIVE DATA

The theme '*blurred boundaries*' offers an overall understanding of how some nurses and midwives offer medical and anti-vaccination advice. Blurred boundaries represent the haziness of the boundary between the personal and the professional, and where the professional boundary ends. Nurses and midwives are not qualified to offer a medical opinion, and they have a clear role in health promotion and education.

The theme of 'blurred boundaries' comprised three sub-themes: (1) '*follow the science'*, (2) '*abuse of power and trust'* and (3) '*The moral and ethical responsibility to safeguard public health'*. The data from the online survey is represented as S1, S2 and so forth, while the data from the interviews has been labelled N1, N2 and so forth.

***Follow the science**:* This theme showed that nurses had learnt and understood the scientific evidence about the safety and efficacy of vaccines and vaccination. The nurses/midwives questioned the intelligence of those professionals who did not understand the science associated with vaccination, with one nurse stating, *'the antigen-antibody rection is not that hard to understand'* (S231*).* In addition, the nurses/midwives knew that they had a role to educate the public on vaccination using the best available science evidence, present the scientific explanations to expose bad science and debunk misinformation. One nurse stated that "*any nurse advocating against vaccination on an anti-vaccine forum is acting against the obligations of their registration…we have a duty to educate people about evidence-based practice and anti-vaccination is certainly not that*" (S368). Nursing students also need to understand their role and if "*they post anti-vaccination rhetoric because AHPRA [Australian Health Professionals Regulatory Authority] has consequences for anti-vaxx health professionals*" (N12).

Anti-vaccination sentiment could challenge friendships and collegial relationships and one nurse stated "*a friend of mine who went to university with me, also employed by the same health district as me, is an avid anti-vaxxer campaigner. She is always posting things on Facebook about 'how vaccines cause autism' etc*" (S79). Another nurse explained "*my colleague is anti-vaxx. Her kids are not vaccinated, and she is only vaccinated to keep her job. She is a member of several anti-vaxx Facebook groups. We have lots of arguments and I tell her that scientific evidence has rejected claims that autism is caused by vaccines, but she still tries to argue with me, and change my mind*" (S525).

***Abuse of power and erosion of trust**:*

Trust is an important consideration in health care, and it can impact on nurses and midwives ability to form meaningful relationships with patients. The connection associated with trust has the potential to positively or adversely impact on health outcomes. This theme was about how the nurses/midwives recognised that sharing and espousing anti-vaxx sentiment was outside their scope of practice as a nurse/midwife and could have implications for the trust that the community placed in them. Power is inherent in the relationship between health professional and patient. Nurses and midwives by virtue of their education and experience have legitimate power, information power and expert power. When a nurse or midwife gives his/her advice that does not support the ideas that vaccines are safe and effective, they use their expert power.

One nurse stated that nurses can abuse that power by "*opposing vaccination for babies and children and using her employment position as registered nurse to strengthen her argument*" (S53). Another nurse spoke about her colleague who was constantly "*posting without sufficient evidence when his profile clearly shows he is associated with the health board*" (S231). For another nurse "*just having nurse as your occupation on Facebook gives credibility*" (N2). One nurse spoke of a friend who *"keeps making comments on Facebook about health-related topics that don't sit with [name of health service] policy and her profile includes her place of work"* (S339). Other nurses saw this as deceptive behaviour "*because people with see the organisation he works for and think they condone anti-vaccination*" (S132). Deceptive behaviour is unethical, and this type of action by anti-vaxx nurses was considered to be "*unprofessional behaviour because they are using their position of power as a nurse to pursue an agenda which is not evidence based or supported by credible research*" (S45). It was not that surprising that no nurse or midwife in the research identified himself/herself as anti-vaxx,, therefore they might not see what they do as an abuse of power,

but the ability to influence, and as one nurse lamented about her friend the anti-vaxxer, *"I think she genuinely sees herself as helping people, whereas I see her as a menace"* (S.35).

The unauthorized practice of medicine is when someone, or in the case of this research, nurses and midwives, give medical advice without holding a professional medical licence and or being registered by a regulatory body. The nurses and midwives spoke about the boundaries of their practice and their scope of practice and outlined the requirement both offline and online to stay within that scope of practice. One nurse stated "*I am in a lot of Facebook groups, and I regularly see nurses giving medical advice. It makes me uncomfortable because you cannot know a situation over Facebook, and we are not doctors*" (S368). Examples of medical advice given by nurses and midwives on Facebook included a nurse who stated, "*she identified herself as a midwife and told mothers in a premature baby group that vaccinating prem [premature] babies could ruin their immune system……in another post she urged mothers of prem [premature] babies to avoid all vaccines*" (S8). A midwife stated that another midwife in a group for pregnant women "*spoke of avoiding the influenza vaccine during pregnancy, as well as declining Vitamin K and the Hepatitis B vaccine for the baby. I'll be honest, I considered reporting her*" (S431).

Anti-vaxx nurses/midwives 'walk a tightrope' when it comes to claiming to be a nurse/midwife and anti-vaxxer, and if found to be breaching regulations they could find themselves referred to their regulatory authority. One nurse stated "*a friend of mine regularly posts on Facebook about her anti-vaxx stance. She is also a conspiracy theorist and me and our nursing friends are regularly lectured to about the dangers of 5G. I am surprised that she has not lost her nursing registration for her extreme views*" (S35).

The moral and ethical responsibility to safeguard public health: This theme was about the ethical requirements of professional responsibility and the consequences of giving anti-vaxx advice. The nurses/midwives outlined the situation of parents who heeded ant-vaxx advice and did not vaccinate their babies and children, possibly contracting a vaccine preventable disease, resulting in death or disability. The health of babies and children was considered important by the nurses/midwives, and they understood that parents, families, and the general public would ask nurses about the safety of vaccines, and that nurses/midwives might be one of the main sources of information about vaccines. The nurses/midwives spoke about the impact that vaccination has had on the global health of children and were concerned when they encountered anti-vaxx sentiment by members of their profession on Facebook. One nurse spoke about the situation where a nurse she worked with was recently admonished for publicly denigrating immunisation and boasting about how she had removed immunisation brochures from the hospital waiting room as she was an anti-vaxxer. The nurse was clear in her contempt by stating "*I find this type of behaviour abhorrent as she is placing innocent children and immuno-compromised patients at increased risk for her own personal bias based on myth and incorrect beliefs, as opposed to the irrefutable science and volumes of evidence-based practice*" (S15). There could be professional consequences for nurses/midwives who gave anti-vaxx advice, and another nurse wondered what would happen if a baby or child died or was damaged if a nurse gave anti-vaxx advice and stated "*it worries me that a nursing colleague of mine 'friends' parents of children on the ward on Facebook, and tries to influence parents not to immunise [vaccinate] their children. I wonder what would happen to that nurse if the baby or child died from a disease that could be prevented by immunising*" (S145).

DISCUSSION

The nurses/midwives had learnt and understood the science of vaccination and believed the scientific evidence about the safety and efficacy of vaccines and vaccination. It is clear that the nurses/midwives knew that they had a role to educate the public on vaccination using the best available evidence, and present the scientific explanations to expose bad science and debunk misinformation. They understood that they had both expert and positional power, and their power should be used to promote health and dimmish the possibility of disease. Nurses and midwives who did not live up their professional requirements were considered by their colleagues to demonstrate poor professional behaviour. One of the key roles of the nurse/midwife is to promote health, with there being a general expectation that the public will follow the advice provided. However, nurses have vocalised their opposition to vaccination programmes [40,41]; whilst in a minority, they have the potential to influence the decisions of patients within their care.

The science of vaccination

The nurses and midwives in the study made it clear that professional nursing and midwifery practice was underpinned by science [42, 43]. The knowledge needed for nurses and midwives about vaccination included antibody-antigen reactions, specific responses, and the impact on patients [44]. Vaccines contain antigens which stimulate the immune system, which can become memory cells assisting the vaccinated individual in future recognition of diseases [44]. The aim of vaccines is to produce a protective response to a specific target pathogen without the risk of acquiring the disease [45].

Power relations

The patient/nurse/midwife relationships are unequal in terms of power, therefore, this could introduce a level of vulnerability for those in our care, and the nurses and midwives in the study were aware of the possibility for a power differential. It is expected that nurses/midwives will neither want to exploit vulnerability nor will do so; however, the nurses and midwives in the

study argued that by voicing anti-vaccination views, this vulnerability may not be being fully appreciated or respected [46]. Furthermore, in power organisations, such as hospitals there can be "coercive power in nurse care interactions" [47]; clearly, there is a danger that this could be taken advantage of. In a similar vein, Fackler and Chambers [48], following their hermeneutic phenomenological research with hospital nurses in the United States of America, found that a sense of power was developed via the gaining of knowledge, practice experience and confidence; the power was primarily used to advocate for the patient and enhance care, but it could be as suggested by the nurses in the study that there is a potential for this power to be misplaced. In relation to the current research, nurses and midwives therefore need to take care not to voice their own anti-vaccination opinions or impose their views on their patients. This could be perceived as an abuse of their power and could potentially be deemed as professional misconduct. Instead, those in our care need evidence informed information to feel empowered to make their own informed decisions.

The ethical and moral beliefs of anti-vaxx nurses and midwives

Nurses and midwives might engage in unprofessional or unethical behaviour without realising it [49]. Not every wrong behaviour is unethical [49], and ethical behaviour for nurses and midwives refers to how an individual ensures that all his/her decisions, actions, and interactions with the community conform to the individual's moral and professional principles [49]. The principles of beneficence (actions should promote good) and non-maleficence (avoidance of harm) are pertinent for this research [50]. When the nurses and midwives in the study spoke about anti-vaxx colleagues, it seemed that the anti-vaxx nurses and midwives truly believed the anti-vaxx rhetoric that vaccines are unsafe and infringe on their human rights, and were very clear that that they were in fact, promoting good and avoiding harm. Despite the fact that they were in clear breach of their professional and ethical requirements, they refused to believe their behaviour was unethical, unprofessional or

harmful, rather than helpful. One-Vaxxed Nurse [51] stated "unfortunately, even a nursing or medical education cannot always override the part of the brain influenced by deeply held religious or political beliefs". In keeping with the overall umbrella theme of the larger research that '*every act has a consequence'*, the act of being an anti-vaxxer can impact on the health of others and have personal and professional consequences for the nurse/midwife.

Vaccine hesitancy in nurses/midwives

Health care providers are consistently cited as the most important source of information that can be provided to parents about immunisations. In addition, health care providers recommendations for vaccinations are considered as vital to help improve vaccination rates [52]. The problem is, however, what happens if those health care providers themselves have vaccine hesitancy or are anti-vaccination. Healthcare providers will be among the first to receive the COVID vaccine yet there is evidence to suggest that some staff are hesitant [50]. This reluctance is surprising considering that they are most at risk of contracting the infection and have seen the consequences of the infection in the patients they have cared for. According to Williams' [53] research conducted in Israel indicates that 22% of doctors and 39% of nurses are hesitant to have the COVID vaccine. Part of the issue is that many health care providers are not experts in vaccinations. In fact, in order for a health care provider to be eligible to give vaccinations requires specific education course around vaccines. Health care providers, therefore, share many of the concerns that the wider public have, despite their health education knowledge.

Vaccine hesitancy in nurses related to COVID-19 was associated with anxiety surrounding the speed at which the vaccines were developed, and their safety and potential side effects, with many participants reporting limited knowledge of the vaccine development [54]. In a French study, vaccine hesitancy generally was higher among hospital nurses as compared to

those working in the community, in nurses with a perception of vaccines as high risk, and among nurses with low trust in health authorities [55]. In a study of nurses in Hong Kong who were highly vaccine hesitant to or who refused vaccination for influenza, scepticism regarding the vaccine's purported safety and efficacy were reported. These studies of nurses identifying the presence of negative attitudes toward vaccination highlight the same fears and scepticism as in the general populations and must be addressed to counter vaccine hesitancy and refusal. One Vaxxed Nurse [51] wrote on their group Facebook blog "yes, there is a small percentage of nurses who are anti-vaccine…..but they are loud. They are also wrong, a danger to themselves, and a danger to their patients." It is sad, yet noteworthy that an anti-vaxx nurse has recently died in the USA from COVID-19 after contracting the disease in June. This nurse had used social media to post "this vaccine has been released using recombinant DNA faster than any vaccine in the world. It manipulates your DNA at the tiniest molecular level. Do. Not. Get. It. It's not safe" [56].

Anti-vaxx nurses and midwives on Facebook

Over the last decade, there has been an increased reliance on social media as an accurate source of health information. Indeed, the research about nurses and Facebook that the current paper is linked to has found many positives associated with Facebook use for nurses and midwives. That said, a US study found that alarmingly, 52% of users believe that almost all information found online is credible [57], despite, in many cases, this being misinformation. The levels of misinformation pertaining to vaccines on social media is concerning, as is the role of nurses and midwives in propagating this misinformation. Access of social media platforms to nurses, midwives and information seeking unqualified individuals is unparalleled, with no capacity to ensure information is from evidence informed sources. Posts on social media by these health professionals can quickly become 'viral' promoting anti-vaccine messages to those who would not normally seek out that information. In Australia,

nurses or midwives who promote antivaccination claims can be subject to regulatory action by the National Board.

A search of Facebook in January 2021 for groups and posts relating to anti-vaccine messaging from nurses and midwives found a surprisingly high amount of anti-vaccine messages. The search was limited to 'groups' and utilised the terms 'health and vac'. The first three groups that had 'against' or 'anti' in their name, also included nurses in either the group name or about information. The combined regularity of posts was over 50 a day, to over 5000 members. This easily accessible information reportedly provided by expert nurses would undoubtedly provide the unqualified individual with misinformation promoting antivaccine sentiment. Facebook is now committed to identifying content and fact-checking posts for misinformation. It has stated that it will improve "the accuracy of stories through original reporting, including interviewing primary sources, consulting public data and conducting analyses of media, including photos and video" [58]. With the burgeoning number of anti-vaxx groups and the potential public health consequences, Facebook has found itself under increasing pressure to deal with the anti-vaxxers. Facebook is committed to dealing with anti-vaccination misinformation by making those posts harder to find, removing anti-vaxx pages and any group that spreads misinformation. Instead, Facebook will elevate authoritative information about vaccines in the news feed [58].

Psychological contributors to conspiracist beliefs

Belief in conspiracy theories was identified in the study. Conspiracist thinking is underpinned by a belief that people who hold power deliberately propagate misinformation to conceal the truth about world events, and distrust of those in power is central [59, 60, 61, 62]. Conspiracy theories fulfil psychological needs, such as providing understanding of complex issues,

security, and belonging [60]. Anti-vaccine conspiracy theories include negative beliefs about vaccine development, safety and effects, and can result in vaccination hesitancy, refusal and ultimately adverse health outcomes [60].

Psychological and social factors, including epistemic beliefs, personality, and world views contribute to attitudes towards vaccination and belief in conspiracy theories. In a large US study, three components of epistemic beliefs - individuals' beliefs about knowledge - reliance on intuition, the importance of empirical evidence, and belief in the political construction of truth were examined in relation to perception [63]. The authors found that those who regard the truth as politically constructed were more likely to accept inaccurate beliefs and that reliance on intuition to determine the truth, rather than reasoning and assessing available evidence, was a predictor of conspiracy thinking. An Australian study on attitudes to vaccination reported that a preference for complementary and alternative medicine rather than conventional medicine, endorsement of spirituality as a source of knowledge, and a personality style of openness to experiences, were associated with more negative attitudes to vaccination and a disinclination to consider related scientific evidence, rather than a deficit in cognitive ability [64].

Similar to the general public, health professionals can subscribe to conspiracy theories, including those related to the development of COVID-19. There is also evidence that some nurses and nursing students hold negative attitudes towards vaccination for COVID-19, influenza and other illnesses, resulting in vaccine hesitancy and, in some instances, vaccine refusal [54, 55].

Nurses and midwives giving medical advice online

There is a disturbing trend of unqualified people giving medical advice on Facebook. 'Crowd sourcing' as it relates to gaining medical advice online, is the practice of obtaining information by enlisting the services of a large number of people via the internet. Crowd sourcing implies 'wisdom of crowds' or the idea that large groups of people are collectively smarter than individuals, even experts, in relation to problem solving and decision making [65]. Confusing crowd experience with medical expertise can have serious consequences.

Registered Nurses have been found to intervene when they noticed that medical advice offered on Facebook was dangerous. Jacqua [66] responded to a post and stated she was a Registered Nurse and that it was dangerous to ask for medical advice and followed it up with a private message saying, "please stop asking strangers on the internet for medical advice and go see your doctor." The response from the person involved was negative. Jacqua's [66] response was "that's what you get when you try to give someone real medical advice over the internet."

Recommendations:

Nurses and midwives worldwide, particularly those industrialised nations, are in a privileged position that provides them with intimate knowledge of the patient's personal circumstances; as recognised experts, and potentially vulnerable patients look to nurses and midwives for advice, and we owe it to those in our care to ensure that this promotes health and is based on science and is evidence-based. It is crucial that they develop insight into their role as a nurse or midwife are familiar with the relevant nursing and midwifery codes of practice and refrain from giving unqualified medical advice. The relevant codes and standards give nurses and midwives confidence that vaccination advice is kept within the boundaries of the regulatory

body. Nurses and midwives have a moral and ethical responsibility within their health promotion role. It needs to be acknowledged that a power relationship exists between nurses/midwives and their patients, and requires working towards empowering those in our care, so that they can make their own informed vaccination decisions. It is imperative that nurses and midwives recognise his/her personal opinions and beliefs to ensure that these do not impact on the quality of care and advice that is provided to others. Professional self-reflection as well as the sharing of thoughts and experiences with others can facilitate personal growth and development that is patient focused. Nursing and midwifery practice must be based on best evidence, and nurses/midwives should retrieve and critically consider the empirical research that underpins vaccination programmes, to enable them to be appropriately informed and to be able to offer the patient an objective perspective.

Strengths of the study

The strengths of this research lie in using a mixed method approach with two large data sources. The combination of two research methods has the potential to offset the shortcomings of using a single method. This could offer greater validity and reliability to the findings of a research. Facebook as a contemporary research method has reached the population under study, and the large number of respondents have provided a wealth of data.

Limitations of the study

While appreciative of the large number of respondents providing rich data, the amount of data has at times proven to be a burden. That said, this large data set has the potential to increase the understandings around nurses and midwives use of Facebook, and provide education to the professions about how to maximise the positives and minimise the negatives.

CONCLUSION

The science is clear: Vaccination is safe and effective. Freedom of speech and thought on Facebook for nurses and midwives comes with responsibility, and using their expert power to promulgate misinformation is ethically and professionally wrong. Nurses and midwives have a professional and ethical obligation to provide evidence informed information as part of their role in providing health promotion and disease prevention. Anti-vaxx nurses and midwives should be given the opportunity to be re-educated. If, however, nurses and midwives are not able to live up to their professional obligations and continue to espouse anti-vaccination rhetoric, despite re-education, their continued registration should be questioned.

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