The influence of social media on parents' vaccine hesitancy

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Abstract

Vaccine hesitancy, defined as the refusal or delay of acceptance of vaccines, is a threat to vaccine preventable diseases and therefore has significant implications for global health. Complacency, convenience and confidence are factors that influence vaccine hesitancy. Vaccine information on social media is often disseminated by lay users (non-healthcare professionals), and its content is often polarising; much is vaccine-negative and found to increase vaccine risk perceptions and decrease vaccination intentions. Parents are exposed to conflicting childhood vaccine information and nurses should be aware of this. More evidence is required to establish the best strategies to convey vaccine-positive information and counter misinformation on social media. Professional bodies should provide guidance for using social media for public health promotion.

Introduction

Vaccines are a powerful public health (PH) intervention and prevent an estimated three million child deaths annually world-wide (UNICEF 2018). However, unlike most medicines, vaccines work on both the individual and societal level, requiring high vaccine uptake to achieve sustained community immunity (WHO 2014, 2019).

The availability of vaccines is expanding, but to reach immunisation goals, growing vaccine hesitancy (VH) must be tackled (Kumar et al. 2016). VH is described as a delay in acceptance or the active refusal of vaccines, importantly people who are hesitant can still be convinced to vaccinate and are not “anti-vaxxers” (WHO 2014; Razai et al. 2021). The WHO (2014) explain that VH can be driven by lack of confidence in vaccines, which is understandable, particularly following the flawed, fraudulent and now discredited publication of research in the Lancet linking the MMR vaccine with autism in 1998 (Godlee et al.2011); after which vaccination rates in western countries dropped (Eggerston 2010, Hussain et al. 2018). Crucially, VH threatens to damage progress made in fighting vaccine-preventable diseases (VPDs) and was reported by the WHO (2019) as a top ten threat to world health, which reflects the ongoing shortcomings of effective vaccine PH messaging.

Parents in particular are required to make several vaccination decisions; choosing if and when their child is vaccinated against numerous vaccine-preventable diseases (Smailbegovic et al. 2003). Charron et al. (2020) found that healthcare professionals (HCPs), the internet (including social media) and relatives are the three main sources of vaccine information. Social media is described by the Cambridge English Dictionary (2013) as any form of electronic communication that enables information sharing on the internet; allowing for quick dissemination of information, which can be easily spread to potentially millions of users (Buchanan and Beckett 2014). It follows that parents are likely faced with conflicting information via their sources, thus complicating their crucial decisions.

This article aims to understand the dissemination (who is sharing information and what is being shared) and the content of childhood vaccine information on social media, along with the impact that this has on parents' attitudes and intentions to vaccinate.

Dissemination of vaccination information on social media

It is important to have an understanding of who is sharing vaccination information on social media. Keim-Malpass et al. (2017) found in their cross-sectional study of Twitter content over a 2-week period that lay

users (non-healthcare professionals) tweeted 74.2% of tweets that included either #HPV or #Gardasil (brand name for the HPV vaccine). Self-identified advocates (incorporating medical/research workers and natural health practitioners) were the next largest group; but tweeted only 9.5% of posts, of which under 5% self-identified as nurses. Comparably, Buchanan and Beckett (2014) analysed the top 30 vaccination-focused Facebook sites in a descriptive study and found that 4 sites had physician authors (n=2 anti-vaccination and n= 2 pro-vaccination). Similarly, little information was disseminated from health-related sources on Instagram. Kearney et al. (2019) conducted a descriptive study of posts containing either #HPV, #HPVVaccine or #Gardasil. Of the 360 randomly selected posts Kearney et al. (2019) reviewed, individuals posted 50.1% and organisations posted 49.9% of the content relating to HPV vaccination, of which only 15.6% and 43.9% were health-related respectively.

Keim-Malpass et al. (2017) found that both lay users and advocates commonly linked a media source in their tweet about HPV vaccination, 79.4% and 72.5% respectively. For lay users these links were most commonly linking to lay media, for example blogs, and worryingly 0.5% of these links were to research findings. Kang et al. (2017) created semantic networks to identify the most salient concepts within networks

expressing positive, negative and neutral content, they analysed vaccination-related tweets over a 6-week period, randomly selecting 50 from the 100 most shared links. Of these, a large proportion linked to lay media; 48% shared blogposts, 24% shared news articles and 16% shared magazine articles. However, they excluded analysing tweets which linked to academic publications, which likely increased the percentage of lay media in their findings. Guirdy et al. (2015) undertook quantitative content analysis on Pinterest of pins found using 4 key words (vaccination, vaccine, vaccinate, vaccines) and similarly found that of 800 pins 81.5% linked to an external website, 19% of these to a blog, and only 3.7% to official medical websites. Twitter and Pinterest vary in nature, and Keim-Malpass et al. (2017) focused exclusively on HPV vaccination, whereas Guirdy et al. (2015) and Kang et al. (2017) focused on general vaccination, making direct comparison difficult, but nevertheless a small percentage of links shared were to medical sources. Essentially, only a small proportion of the vaccination information on social media is disseminated by HCPs.

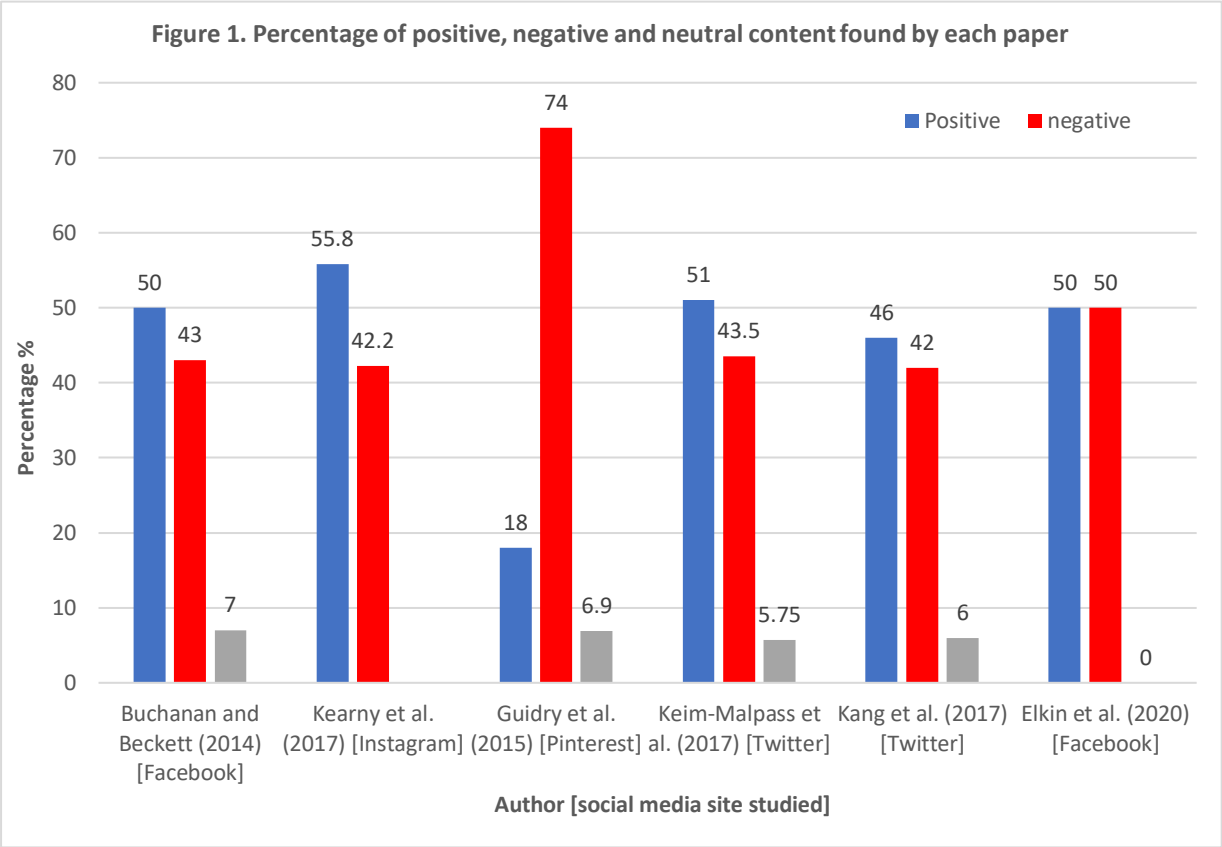
Content of vaccination information on social media

Examining the content (positive, negative or neutral) of vaccination information on social media is important when considering the possible

impact of such information. Keim-Malpass et al. (2017) found that of the 1974 posts on twitter, 50.8% of tweets were vaccine-positive , 43.5% negative and 5.8% neutral. Their study specifically focused on tweets related to HPV vaccination. Kang et al. (2017) also found content to be polarising on Twitter, only 46% were analysed as being positive, 42% negative and 12% neutral. Following a similar polarising trend, Kearney et al. (2019) found that of the 360 Instagram posts, 55.8% relating to HPV vaccination were positive and 42.2% negative. Facebook was equally polarising; of the top 30 Facebook sites relating to vaccination 50% were positive, 43% negative and 7% of neutral (Buchanan and Beckett 2014). Elkin et al. (2020) searched Google, Facebook and YouTube using the 20 most searched for childhood vaccination terms, which similarly found that of the 20 most popular vaccine-related Facebook pages there was an equal split of 50% vaccine-positive and 50% vaccine-negative.

Guirdy et al.'s (2015) findings are of further concern, highlighting higher levels of negative content on Pinterest. Of the 800 pins analysed, only 18% were positive, 74% negative, 6.9% neutral and 1.1% inconsistent. Content was manually coded similarly to other studies. This study was carried out over three days, and the authors do not report any changes in vaccination-related activity in the media within this timeframe that

could have impacted the findings. Whereas, Keim-Malpass et al. (2017), Kang et al. (2017) and Kearney et al.'s (2019) studies were carried out over longer periods, potentially capturing a more representative window, and Elkin et al. (2020) and Buchanan and Beckett (2014) studied Facebook pages, which are more static in nature. Essentially, the content of vaccine-related social media content is largely polarising, demonstrated by variable percentages of positive and negative content across different social media platforms (Figure 1 Percentage of positive and negative and neutral content found by each paper).



Impact of social media on vaccine uptake

As highlighted by the WHO (2014), confidence is a factor that affects VH. Nan and Madden (2012) carried out a quantitative controlled study of college students exposed to either a negative or positive HPV vaccine blog post, or no blog post. Betsch et al (2010) carried out a study in which participants were allocated to read either a vaccine

neutral, or critical website, or both. Both Nan and Madden (2012) and Betsch et al. (2010) found that exposure to a negative HPV vaccine blogpost or a vaccine-critical website respectively, increased risk perception of vaccination and reduced the individual's intention to vaccinate when compared to control groups. Betsch et al. (2010) found that reading a vaccine-neutral site decreased the risk perception of vaccinating, whilst interestingly in contrast, Nan and Madden (2012) found that accessing a vaccine-positive blogpost did not change vaccine risk perceptions. Accessing vaccine-critical sites was found to increase vaccine risk perception and decrease vaccination intention.

Negativity bias

There is a significant volume of vaccine information on social media, and as described above a proportion of this is vaccine-negative. Much of the information is disseminated by lay users, often containing misinformation, which tends to gain more attention from users. This is a PH threat, given that even short exposure to HPV vaccine-negative information can increase risk perceptions and reduce vaccination intentions (Betsch et al. 2010, Nan and Madden 2012). Interestingly, Nan and Madden (2012) found that a HPV vaccine-positive blogpost did not change perceptions. The notion of negativity bias could partially

explain this; the inclination for individuals to place more weight on negative information than positive information (Rozin and Royzman 2001). Vaccine-negative content often revolves around emotionally charged personal narrative, focusing on alleged damage caused by vaccines, playing on parents' fears and more likely to linger in parents' minds and impact their decisions (Healy 2014). Furthermore, omission bias could increase the impact of vaccine-negative information; individuals often feel more guilty committing rather than omitting an action that may cause harm (Politi et al. 2017). The potency of negative information, along with parental guilt, makes counterbalancing negative messages challenging.

Public health implications

The detrimental impact of vaccine-negative content is concerning given the significant volume of it on social media (Buchanan and Beckett 2014, Kang et al. 2017, Keim-Malpass et al. 2017, Kearney et al. 2019, Elkin et al. 2020). The majority of this misinformation is disseminated from lay sources, which rarely provide links to official medical sources. Additionally, reposting features on social media are popular, allowing for this unfact-checked content to be widely shared with a click (Buchanan and Beckett 2014, Guirdy et al. 2015, Kang et al. 2017,

Keim-Malpass et al. 2017). Wilson and Wiysonge (2020) found a clear relationship between organisation of vaccine-negative content on social media and public concerns of vaccine safety, making it likely to become more problematic as younger generations, who increasingly seek information on social media, become parents (RSPH 2018).

Given the severe threat of vaccine misinformation to PH, some social media platforms claim to be taking note; Facebook (2019) report that they use various methods to tackle misinformation, including reducing the ranking of pages that spread vaccine misinformation and developing ways to share evidence-based information. Worryingly though, Elkin et al. (2020) report that of the top 20 vaccine-related Facebook pages; 50% were vaccine-negative, suggesting that Facebook may not be successfully tackling misinformation. Despite this, amidst the Covid-19 crisis, Facebook (2020) have rapidly actioned strict measures to counter Covid-19 misinformation, including investment in fact-checker technology. Additionally, the UK Government (2020) set up a specialist unit to combat Covid-19 misinformation, collaborating with social media platforms and pressing them for action to fight Covid-19 misinformation. Given this swift action, it seems possible that these technologies could have been employed sooner to fight vaccine misinformation. It is yet to be seen if this level of

regulation will be implemented for other damaging misinformation post Covid-19.

Public Health England (PHE) (2019) report that nurses are among the most trusted sources of vaccine information, suggesting that nurses should have a presence where parents seek their information, which is increasingly on social media (Charron et al. 2020). It is therefore worrying that nurses have little social media presence (Keim-Malpass et al. 2017). The Nursing and Midwifery Council (NMC) (2019) published guidance, reminding members that inappropriate use of social media can lead to loss of professional registration, but exact rules remain vague and there is no guidance for using social media to promote PH. Whilst the General Medical Council (2013) have issued similarly vague guidance, there is acknowledgement of the benefits of providing health information through social media.

For nurses who choose to fight vaccine misinformation on social media, the challenge is two-fold; Yang et al. (2019) report the importance of providing accurate, digestible information, whilst Steffens et al. (2019) add that directly confronting misinformation must be considered, but point out that this is complex, requiring caution to avoid amplifying misinformation. Some have, perhaps controversially,

highlighted the role of storytelling, suggesting that focusing on personal accounts of vaccines preventable diseases and reminding parents of past horrors can be a powerful emotive method to promote vaccination (Healy 2014, Cawkwell and Oshinsky 2016). Whilst further research is required to determine the most effective strategies to convey information and counter misinformation on social media (Healy, 2014), addressing why misinformation is shared is clearly more effective than tackling the impact of it. William's (2020) argues that motivated ignorance is largely to blame – that in which people advertise certain beliefs because they are socially rewarded and it forms part of their identity. In this case, simply providing people with more information is unlikely to help; rather a deeper understanding of the social incentives for such behaviour is required in order to combat this (Williams 2020). On a more sinister note and one which makes the challenge more complex is the emerging evidence that misinformation is being disseminated by Russian bots and troll farms to strategically undermine public health in developed countries (Wilson and Wiysonge 2020).

Implications for nursing practice

The NMC (2018) stipulate nurses' duty to promote health. Vaccination is one of the most effective PH promotion measures and as such is a healthcare priority. As highly trusted vaccine information sources (PHE

2019), nurses are ideally placed to promote vaccination both in practice and on social media. Whilst Yang et al. (2019) suggest that nurses must rise to the challenge of bridging the gap between research and the lay person by providing evidence-based, understandable information, Lewandowsky et al. (2021) report that simply recommending a vaccine and leading by example, through personally choosing to vaccinate, are simple yet effective strategies. Furthermore, directly challenging misinformation is important, however if not done effectively could prove counterproductive (Steffens et al. 2019). Nurses should be trained in the best strategies, in order to optimise their impact on social media, and given the current global effort to achieve effective Covid-19 vaccination rates, it is likely that further research will soon emerge in this area. Crucially, for nurses to feel confident to contribute on social media, the NMC should provide explicit guidance on social media use for PH promotion. In the meantime, nurses have a responsibility to acknowledge the volume of vaccine-negative information parents are exposed to on social media, understand the impact of this, recognise their power as trusted information sources and be confident in answering questions and signposting to evidence-based sources on and off of social media.

Conclusion

Lay users disseminate the majority of the vaccination content on social media; of which the content is polarising, and a large proportion is vaccine-negative. This can have a worrying effect on vaccination intentions. Currently social media platforms' policies are falling short in the fight against vaccine misinformation; but nurses can play a key role by providing accurate information and challenging misinformation both on and off social media. Crucially, more research is needed in order to combat the spread of misinformation and to determine the best way to provide accurate information on social media, and more thorough NMC guidance is necessary for nurses to feel confident in doing so.

The WHO (2019) highlight VH as a serious PH threat and social media has the ability to facilitate the spread of vaccine misinformation. As more people turn to social media for vaccine information, nurses must realise their unique power to promote vaccination and fight VH, and in doing so will directly contribute to the eradication of vaccine preventable diseases.

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