



Social media and HPV vaccination: Unsolicited public comments on a Facebook post by the Western Cape Department of Health provide insights into determinants of vaccine hesitancy in South Africa



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ABSTRACT

On the 4 February 2019, the Western Cape Department of Health's Facebook page announced the implementation of a school-based vaccination campaign aimed to administer the first doses of human papillomavirus (HPV) vaccine in public schools to Grade 4 girls who are nine years old. This announcement was met with a flurry of social media responses posted on the campaign's Facebook page. This study identifies determinants of vaccine hesitancy amongst responses provided by social media users to this post. On 8 March 2019, we conducted a qualitative study including all 157 comments to the Facebook post. The post had 659 'emotion' reactions: 574 "likes", 62 "loves", 21 "angry faces", 2 "laughs", 2 "wows" and 1 "sad face". An overwhelming majority (636/659 i.e. 97%) of reactions were favourable to the HPV vaccination campaign. Out of the 157 comments, we judged 52 (33%) of them to be 'hesitant', suggesting that people with negative reactions though few in number, were more likely to be vocal deniers. Concern around the safety of HPV vaccines including effects on reproductive health was the most common theme identified. Other emerging themes included: risk of cervical cancer perceived as being low, issues around consent, concerns that girls are being used for research, questionable vaccine effectiveness, use of the school-based strategy for the campaign, risk-benefits calculations of HPV vaccination and constraints such as stock-outs. Knowing someone who had been affected or being at risk of cervical cancer, having knowledge about the causes of cervical cancer, confidence in the effectiveness and safety of the vaccine, knowing the vaccine was being used in high income settings, and having strong recommendations from the World Health Organisation and key actors seemed to increase the willingness to accept the vaccine. The magnitude and causes of HPV vaccine hesitancy need to be investigated to ensure the success of this programme.

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1. Introduction

It is estimated that 75% of sexually active people are infected with the human papillomavirus (HPV) during their lifetime [1]. Although most HPV infections are transient and asymptomatic, persistent infection with HPV may result in cancers affecting the

cervix, anus, vulva and vagina, penis, and oropharynx [2,3]. There are over 200 HPV types with the majority of HPV related pathologies being as a result of infection with HPV types 6, 11, 16, and 18 [4,5].

Cervical cancer is the most common cause of HPV associated mortality [6]. The burden of this disease is most severe in low and middle-income countries, especially in sub-Saharan Africa and South-Eastern Asia. South Africa is ranked as the ninth country with the highest number of new cases of cervical cancer among women of all ages, with an estimated 12,983 new cases and over 5595 deaths each year [7].

HPV prophylactic vaccines which include the bivalent Cervarix, the quadrivalent Gardasil and the nonavalent Gardasil are powerful tools for the primary prevention of cervical cancer and other

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HPV-associated diseases [3,8–13] HPV vaccines have been progressively introduced in many countries. Globally 71 countries (37%) had introduced the vaccine for girls, and 11 countries (6%) for both girls and boys by 2017 [8]. These countries have used different strategies including: school-based vaccination, health-centre-based vaccination, vaccination combined with other health interventions, or a combination of two or more of these strategies [14]. The bivalent and quadrivalent HPV vaccines have been available in the South African private health sector since 2008. In 2014, South Africa initiated its national HPV vaccination programme in public health sector. This programme aims to provide free vaccination to all grade 4 girls aged ≥ 9 years in public schools, currently using the bivalent HPV vaccine [15].

A growing body of research suggests that vaccine hesitancy poses a serious threat to HPV vaccination programmes worldwide [16–21]. Vaccine hesitancy refers to a delay in acceptance or refusal of vaccination despite availability of vaccination services [22]. It is a complex phenomenon, and its nature and drivers vary for different vaccines across different contexts [23–25]. In the case of the HPV vaccine, hesitancy is particularly exacerbated by the outbreak of rumours and misconceptions on long term negative adverse events, especially those related to fertility following the vaccination of young girls [26,27]. Other factors that have been identified include the quantity and quality of information that is available about HPV vaccination, existing distrust of health authorities, healthcare workers and pharmaceutical companies, and suspicion of new vaccines [16]. Most of the research on vaccine hesitancy, including HPV vaccine hesitancy, has been conducted in high-income settings. Our understanding of the nature and drivers of HPV vaccine hesitancy in low and middle-income countries is therefore limited [28,29].

Social media, which refers to channels and tools that allow individuals to interact, share opinions and content in online spaces, can be a useful tool for sharing information around vaccines [30]. Unfortunately, it can also be a source of misinformation, inciting negative emotions towards vaccines and leading to an increase in hesitancy to vaccinate [30–32]. On 4 February 2019, the Facebook page of the Department of Health of the Western Cape Province of South Africa (Western Cape Government Health) announced the beginning of the HPV vaccination campaign for 2019. During this campaign, the first dose of the HPV vaccine was to be administered to grade 4 girls who are at least nine years old and attending public schools, between 5 February and 15 March 2019. This announcement was met with a flurry of social media responses posted on the campaign's Facebook page. With the exception of a few studies that explored acceptance of HPV vaccination prior to the 2014 introduction of the national HPV vaccination programme in the public health sector [33–35], very little is currently known about the phenomenon of HPV vaccine hesitancy in South Africa. In this study we examine the determinants of vaccine hesitancy arising from social media users who commented on this post. This study thus gives insights into the potential state of HPV vaccine hesitancy in the South African context.

2. Material and methods

On 8 March, we collated all the comments that were posted on the Western Cape Department of Health's Facebook page in response to the Government's announcement about the HPV vaccination campaign. We also collected all the 'emoticon' responses made on the page by viewers.

The Government's announcement read: "Western Cape Government Health teams to administer the first dose of the vaccine that prevents Human Papilloma-virus (HPV) related cervical cancer". Underneath this sentence was a link to the Western Cape Govern-

ment's official page where more information was detailed about the purpose and achievements of the HPV vaccination campaign to date. The website further provided brief information on the state of HPV infection, cervical cancer, and the HPV vaccine.

<https://www.facebook.com/WCGHealth/photos/a.1844195455623156/2573512072691487/?type=3&theater>

To assess the attention received by the post on the HPV vaccination campaign, we counted the number of reader's 'emoticon' reactions, comments and shares to this post and compared it to those received by five posts by the Western Cape Department of Health posted both before and after the HPV vaccination campaign. The counts were used to plot bar charts in Excel to enable visual comparison.

We analysed the data using a basic thematic analysis approach [36]. We copied and pasted all the comments to the post from Facebook into a word document, removing identifiers of comments to reduce risk of rater bias. AW and EM reviewed and reflected on the comments, and then independently coded the responses through line by line readings as pro-vaccination, anti-vaccination or neutral. The codes were compared and discrepancies resolved. After labelling the data with the main codes, we used an inductive thematic analysis approach to extract emerging themes from comments coded as being anti-vaccines. Under each theme, we reflected on the meaning given to the issue by the respondents to identify emerging subthemes. Discussions were undertaken between AW and EM to verify the 'fit' of the themes with the coded extracts and overall data set. Discrepancies were resolved through discussion and consensus. This enabled us to refine the specifics of each theme and to understand the relationships between the various vaccine hesitancy themes.

At this point, we examined existing conceptual frameworks on vaccine hesitancy to determine if any of these might help us to further categorise and understand the emergent themes. We identified the 5C scale proposed by Betsch et al. [37] to be a particularly relevant and useful model for understanding the determinants of vaccine hesitancy that were emerging from the data. This scale proposes a psychological framework which can be used to measure the psychological antecedents of vaccination. Based on this framework, we organized our findings under five main headings: confidence, constraints, complacency, calculation and collective responsibility [37]. Confidence is trust in the effectiveness and safety of vaccines, the system that delivers them or the motivations of policy-makers who decide on the need of vaccines. Complacency is a situation where vaccination is not considered necessary because the perceived risks of having a disease is low. Constraints refer to issues that affect immunization service uptake such as availability, affordability, willingness to pay, geographical accessibility, language and health literacy [24,37]. In some circumstances, individuals engage in extensive information searching to enable them to decide on whether to vaccinate or not. This is referred to as calculation. Collective responsibility refers to a situation when one makes a decision to vaccinate guided by the willingness to protect others through herd immunity [37]. Organising our findings into these five categories helped enrich our interpretation of the findings.

Ethical approval was not required for this study as this was publicly available information.

3. Results

We accessed the information on the Western Cape Government Health Facebook page on the 8 March 2019. Based on information available on Facebook, the Government's Facebook page was created on Dec 11, 2017 and as of the 8 March 2019, it had 11,550 followers and 11,417 likes. The post had 659 reactions: 574 "likes", 62

“loves”, 21 “angry faces”, 2 “laughs”, 2 “wows” and 1 “sad face”. An overwhelming majority (636/659 i.e. 97%) of reactions were favourable to the HPV vaccination campaign. There were 157 comments and the post had been shared 156 times. We compared reader’s reactions to the HPV vaccination campaign with reactions to five posts by the Western Cape Government Health both before and after the HPV vaccination campaign around other topics such as emergency phone numbers, news on new medical interns, missing patient, new radio soapie on raising a healthy and happy child (side-by-side), national immunization coverage surveys, medical male circumcision, sterilisation and contraception.

As shown in Fig. 1, the Facebook post on the HPV vaccination campaign had significantly more reactions, comments and shares compared to other posts on the page.

Out of the 157 comments, we judged 52 (33%) of them to be ‘hesitant’ to the HPV vaccine. Generally, the hesitant people seemed to have highly negative views about HPV vaccination, with many expressing strong objection to having their children vaccinated;

“No child of mine will be having this injection”
 “Out of them all this 1 is the BIGGEST HELL NO”
 “I will be sure to keep my children away from that”

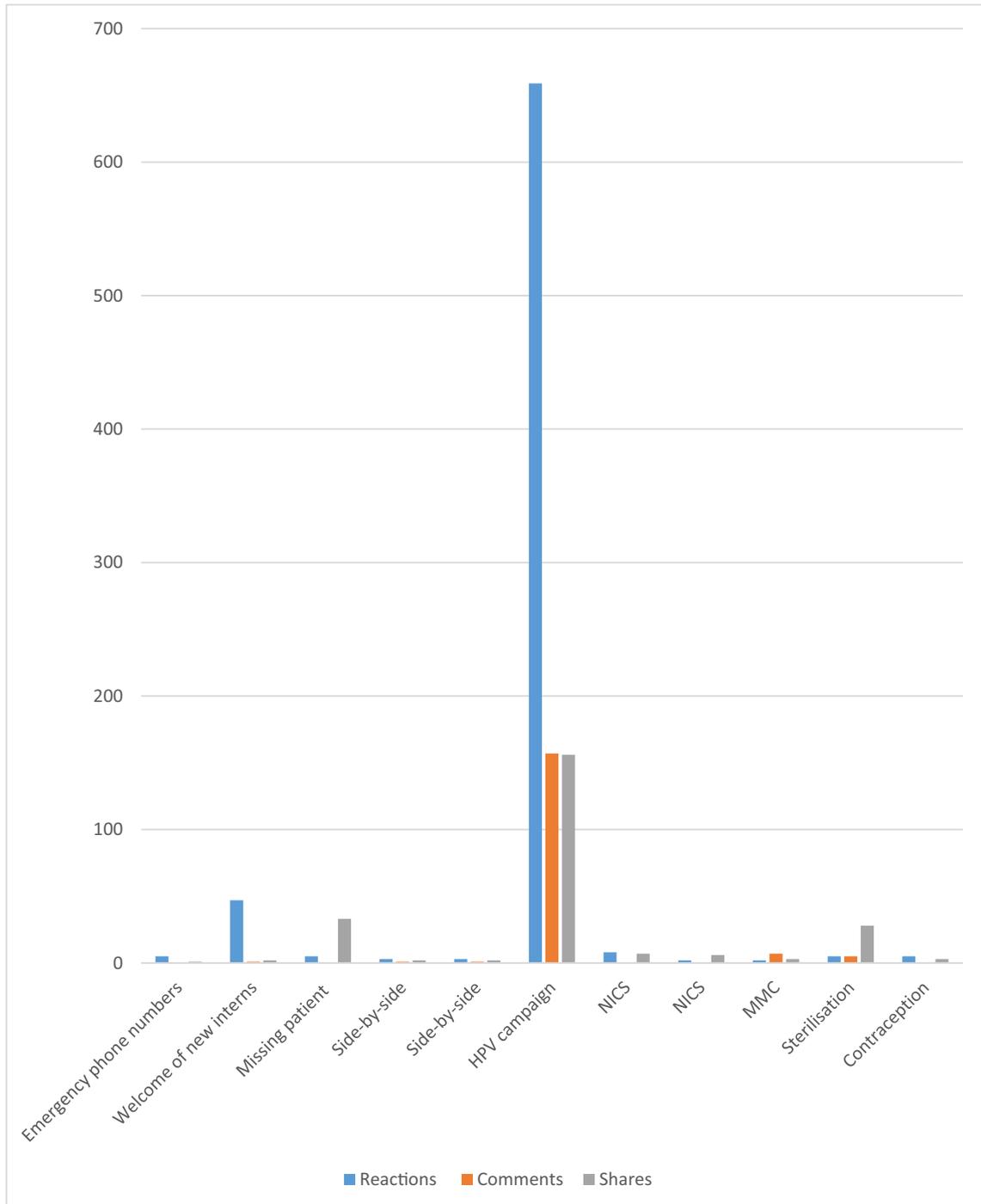


Fig. 1. Number of reactions, comments and shares on posts found on the Western Cape government Facebook page by topic.

“If I ever have a daughter I will make sure she never gets this injection”

One parent referred to the HPV vaccination as “agenda 21”, an agenda which she believed was meant to significantly reduce the population. This parent planned to leverage on the fact that vaccines are currently not mandatory in South Africa to fight back in case her daughter is rejected from school for not being vaccinated:

“I want to fight. Have her rejected and have a huge law suit. . . I’m sure funding won’t be a problem. . . maybe it’s what we need”

We equally observed that a few people who were in favour of HPV vaccination were very vocal about their choice with reasons to support their decisions. There were instances of heated Facebook discussions around the topic between commenters. For example, one commenter challenged a hesitant parent who was questioning the safety of the vaccine:

“This is a typical anti-vaxxer comment. “Has it been proven safe. . . blah blah blah?” Are you aware of the danger of cervical cancer? Do you have a daughter, know any young girls? Would you want them exposed to cervical cancer? Please trust the medicine and the years and years of extensive medical professional research into vaccines. If we don’t take on campaigns like this one, we knowingly subject children to something 100% unsafe and life threatening”

We identified several themes regarding the reasons or underpinning motivations for these strong views for or against the HPV vaccination programme. We have organised these themes under the headings of the 5C framework: complacency, confidence, calculation, constraints, and collective responsibility.

3.1. Determinants of vaccine hesitancy

The determinants of vaccine hesitancy identified from the 52 hesitant comments related to issues of confidence in the vaccines and the system that delivers them, complacency, calculation and constraints.

3.1.1. Confidence

The main themes that emerged under confidence include: concerns around vaccine safety, consent, belief that the vaccination campaign is an ongoing vaccine trial, concerns around HPV vaccine effectiveness and concerns around the use of the school-based strategy for HPV vaccination. We identified subthemes under each of these themes.

3.1.1.1. Concerns around vaccine safety.

3.1.1.1.1. *Knowing someone affected by HPV vaccination.* People who claimed to know someone that had been affected by the vaccine seemed to have reservations about letting children receive the vaccine:

“I really am pro-vax, but I personally know someone who was affected by this, and her daughter will never be the same 😞. Parents needs to do their homework before giving consent.”

3.1.1.1.2. *Previous negative experience with HPV vaccination.* One parent who claimed to have experienced awful side effects following one dose of the HPV vaccine, expressed concerns about the vaccine being administered to young girls and boys:

“I had this vaccine, awful side effects after having only the first shot! Am scared to think what might have happened if I had completed all 3! Absolutely disgusting that they are giving this to young girls and boys”

3.1.1.1.3. *Hearing stories about people who had been affected by HPV vaccination.* Parents who claimed to have heard or read about young girls developing side effects after getting the vaccines, will not accept the vaccine, with some readily sharing relevant links to Facebook pages that they believed corroborated their arguments:

“I too heard of stories and read about them. I’m sorry I will not expose my daughters unnecessary to something that was not proven Hundred percent, my daughters should’ve gotten theirs about a month ago and I did not give consent.”

There were particular concerns regarding Gardasil as some people had read that it was associated with serious permanent side effects, including death:

“Western Cape Government Health why are you guys administering Gardasil, it has been proven to have a high mortality rate. All you need to do it type in Gardasil death in the Facebook search bar to see the results. This shouldn’t be administered to our daughters!!”

3.1.1.1.4. *Inadequate handling of concerns around vaccine safety.*

One of the commenters highlighted that their concerns about the safety of these vaccines were not being addressed, making it hard for parents to trust the vaccines:

“They come with their copy and paste responses, but don’t answer the questions on the side effects.”

3.1.1.1.5. *Lack of transparency on safety data.* Concerns around the lack of transparency on vaccine safety data, underpinned by distrust of pharmaceutical companies seemed to increase hesitancy.

“Safety studies were also done by one of the major vaccine producers and certain results were never published. . .why? So, to have this shoved onto our kids and parents with the promise that they will be safe after the vaccine and not maimed when in actual fact the safety is unknown is not fair”

3.1.1.1.6. *Lack of accountability and support following the occurrence of HPV vaccine side effects.* There were concerns that those whose lives were deemed ‘destroyed’ by the HPV vaccine had not received enough assistance and deserved justice. This was further fuelled by distrust of pharmaceutical companies.

“What campaigns do you have in place to assist those injured by the vaccine?”

“You do know that the pharmaceutical companies cannot be held accountable for any vaccine injury or death. . . right?”

“Who will then be held responsible for the various short and long-term side effects??”

3.1.1.1.7. *Fear of vaccine side effects.* Parents expressed concerns of potential side effects of the vaccine in young girls and boys considering that it is known not to be 100% safe:

“Has it been proven safe and complication /side effect free yet? I am not an anti - vaxxer but I don’t think it’s a good idea to knowingly subject children to something not 100% safe”

3.1.1.1.8. *Fertility related concerns.* One commenter queried the reasons why such a vaccine will target only a sensitive group like adolescents and not adults. There were concerns that if young girls get this vaccine, they will not be able to bear children when they grow. Some believed that the vaccine was part of an agenda to significantly reduce the population by slowly rendering young girls sterile:

“Omg. . . Agenda 21 in full effect. . . come close to my child with this I will hurt you”

The vaccine was also thought to be associated with conditions such as teenage menopause, ovarian failure and sudden onset of endometriosis.

3.1.1.2. Consent. Several subthemes with opposing views were identified regarding concerns around consent.

3.1.1.2.1. Mandatory parental consent seen as necessary. Some respondents felt that parental consent should be mandatory and respected. There was a case cited of a young girl who allegedly developed constant pain and frequent hospitalisation because she got the HPV vaccine despite deliberate denial of permission from her parents. In this case, the respondent claimed that consent was signed by the nurse.

3.1.1.2.2. Mandatory parental consent seen as suspicious. Other parents considered the request for parental consent as being suspicious considering the importance of vaccines and the fact that consent was not required for other childhood vaccines.

“That’s my argument as well why must I give my consent if the other vaccination is compulsory without consent”

“But my question is why do you need to sign for this if it’s so important unless there is something thing they are not telling us. I will not give consent. sorry... My child will not be an experiment”

3.1.1.2.3. Involving young girls in the consent process. The importance of having consultations with the young girls who are due to receive the vaccine also emerged. One parent highlighted that the decision to accept the vaccine will be made jointly with her daughter.

3.1.1.2.4. Decision of young girls to be vaccinated even against parental consent. Others believed that some young girls might still decide to get vaccinated even if the parents failed to give consent.

3.1.1.3. Belief that the vaccination campaign is an ongoing vaccine trial. Some parents refused to have their children take the vaccine because they felt that the vaccine was being tested on their children. One stated:

“My child is not a guinea pig to test this junk on. No from me”. Another one mentioned:

“My child will not be an experiment”

3.1.1.4. Concerns around HPV vaccine effectiveness. There were concerns over the lack of sufficient convincing scientific evidence that the HPV vaccine works in preventing cervical cancer and that patients will still need to routinely screen for cervical cancer after being vaccinated:

“There is no hard, cold evidence that the vaccine has been proven to prevent even 1 case of Cancer, how would that be done? It’s all theory...”

Some parents felt that the vaccine had “failed” in first world countries yet was being used in our setting due to the current economic climate.

3.1.1.5. Concerns around the use of the school-based strategy for HPV vaccination. Two parents questioned the rationale of the programme being rolled out in schools:

“It is a Department of Health roll out. Why the hell they are doing it through schools ... I just don’t know. Schools are for education not vaccines”

“I was so disturbed by this when the school sent me a letter informing us about this vaccination taking place. I did not sign the permission slip this just doesn’t sound right”

3.1.2. Complacency

3.1.2.1. Risk of cervical cancer perceived as being low. People who perceived the risk of cervical cancer to be low were more likely to be against HPV vaccination. These perceptions were at times based on misinformation about the cause of cervical cancer. One noted that the disease was hereditary:

“Cervical cancer like all cancers are hereditary. If no risk has presented itself in my family tree, why should I or would I subject my child to the myriad of complications that has presented with this vaccine”

3.1.3. Calculation

People who felt that the risk of vaccinating children with the vaccine far outweighed the benefits of receiving the vaccine were more likely to express hesitant comments. This was based on two assumptions. One was that though HPV can cause cancer, it is not always the case that HPV infection will lead to cancer hence the futility of getting the HPV vaccine which does not even have a 100% guarantee of protecting those who have been vaccinated. Also, the odds of developing adverse reactions to the vaccine are a lot greater than the odds of getting cervical cancer.

“The odds aren’t looking so good for the vaccine compared to that of people affected by cervical cancer. The factual stats of the amount of people injured/killed with severe reactions to the vaccine are 1 in 500 (and this only where the link has been made to the vaccines, where according to the FDA is only 5% of the serious reactions which were reported). Where Cervical Cancer is 1 in 40 000!!! Personally, I will take the chance, but to each his own I guess.”

3.1.4. Constraints

3.1.4.1. Vaccine stock-outs. There were complaints of vaccine stock-outs as the reason children had not been vaccinated:

“Maybe it will still be coming to our area but the clinic said they have no stock. She is 12, other parents who were able to purchase the injection had done so. And others cannot afford to. Will the 6 year injection also become available soon?”

3.1.5. Collective responsibility

We did not identify factors around collective responsibility that seemed to make respondents less likely to accept HPV vaccines.

3.2. Determinants of HPV vaccine acceptance

Out of the 105 non-hesitant comments, factors that seemed to have a positive impact on the decision to accept HPV vaccine could be grouped under two main headings of the framework: confidence and calculation.

3.2.1. Confidence

Confidence in the effectiveness and safety of the vaccine seemed to increase vaccine acceptance. Knowledge of HPV infection and cervical cancer also had a positive effect on the willingness to accept the vaccine:

“You can keep arguing, but if you are a woman who has ever been sexually active, the chance is you have had, or have HPV at some point in your life. You might be the person who cleared it by yourself, but if not I’d be thankful to the vaccine to sort it for me, or my son or daughters”.

This was further boosted by strong recommendations from key immunization actors such as the World Health Organisation and by

the fact that the vaccine was being used in high income settings such as in Britain and the United States of America.

3.2.2. Calculation

When the perception of the risk of cervical cancer was high and side effects of the vaccine were regarded as being minimal compared to the benefits conferred by the vaccine, this fostered vaccine acceptance:

“We have precancerous cells in our family. We’re vaccinated”
 “Any possible side effects from this vaccine (which are minimal) are nothing compared to the possibility of dying from cervical cancer”

3.2.3. Complacency, constraints and collective responsibility

We did not identify factors around complacency, constraints and collective responsibility which seemed to motivate respondents to accept HPV vaccines

3.2.3.1. Responses from the Western Cape Government Health. The Western Cape Government Health Facebook page administrators responded to eight comments. In three of these responses, they expressed gratitude to comments that were supportive of the HPV vaccination campaign. One response was for a person who was hesitant when the school sent her a letter about the campaign, and another response was for a person with complaints about vaccine stock-out in her area. Three responses were to comments requesting more information about where to get vaccinated.

4. Discussion

The World Health Organization has initiated a plan to eliminate cervical cancer. In order to ensure the elimination of HPV related infections and diseases, countries need to ensure the widespread introduction and uptake of HPV vaccines, with a target coverage of 80% in girls and boys for this plan to succeed [29]. Vaccine hesitancy poses a threat to reaching this target. Indeed, the World Health Organisation lists vaccine hesitancy as one of the ten threats to global health in 2019 due to the deleterious effects it could have on vaccine programmes [22].

In this study, we have explored the nature of vaccine hesitancy arising from social media users who responded to the Western Cape Government Health announcement. Our study provides important insights into HPV vaccination hesitancy in South Africa, a phenomenon that is currently not well-understood in this setting. The high number of responses to the HPV campaign Facebook post, compared to other Western Cape Government Health posts, suggests that HPV vaccination is a highly pertinent and potentially contentious issue in the country. More research in this area is thus clearly needed.

In this study, an overwhelming majority (636/659 i.e. 97%) of reactions seemed favourable to the HPV vaccination, similar to the findings of Perlman et al. [38] However, out of the 157 comments, we judged 52 (33%) of them to be ‘hesitant’ to the HPV vaccination; suggesting that people with negative reactions though few in number, were more likely to be vocal deniers. We identified several issues that may be contributing to HPV vaccination hesitancy in South Africa: risk of cervical cancer perceived as being low, vaccine safety concerns including fertility related concerns, issues around consent, concerns that girls are being used for research, questionable vaccine effectiveness, use of the school-based strategy for the campaign, risk-benefits calculations of HPV vaccination and constraints such as stock-outs. These determinants have been identified in studies conducted in other African countries such as Tanzania and Uganda which are also countries with

a high burden of cervical cancer [20,26]. We note, however, that unlike studies conducted in these settings, concerns around early sexual debut and promiscuity amongst the vaccinated girls was not mentioned.

We found that the 5C psychological framework proposed by Betsch et al. [37] provided a relevant and useful framework for organising our findings on the factors potentially contributing to HPV vaccination hesitancy in South Africa. The 5C model, like many other vaccine hesitancy frameworks, is based on research conducted in high income countries, and thus its appropriate generalizability to Africa is unclear [28]. While more research is needed, this study has revealed that this model may be appropriate for capturing the nature and determinants of HPV vaccination hesitancy in South Africa.

Following the role out of the HPV vaccination campaign in South Africa in 2014, Delany-Moretlwe et al. examined the program coverage, vaccine safety and factors that influenced implementation. The authors noted several successes of the program, such as strong political commitment, high coverage, and positive media coverage. They did, however highlight various challenges, such as significant inequalities in vaccination coverage, with 2 sub districts in KwaZulu Natal and Mpumalanga, having low vaccine coverages of 40% and 43%, respectively. These were attributed to anti-vaccine activities and issues around informed consent. In fact, the vaccination campaign was found to have been negatively affected in areas where misinformation and rumours had been shared on social media [15].

Our study reveals that social media platforms like Facebook can be a means by which anti-vaxxers spread information. Several social media platforms are putting in place strategies aimed at curbing the circulation of misinformation around vaccines. Facebook for example recently announced steps that will be taken in this effect. They plan to remove incorrect contents, reducing the reach of that content by making it harder to find and sharing educational information about vaccines when people come across misinformation on this topic [39]. Designing and adopting context specific effective communication strategies is also critical. The WHO regional office for Europe has developed guidance on how to respond to vocal vaccine deniers [40]. On the other hand, there are hesitant parents that aren’t necessarily vocal deniers hence the need to listen to and address people’s concerns and anxieties.

The findings of this study cannot be confidently generalised to the situation in the Western Cape or South Africa because the Facebook page of the Western Cape government is readily accessible to readers worldwide and could reflect the concerns of people from other settings. Furthermore, the views represented in this paper are those of a small group of vocal parents who use social media and do not necessarily represent the views of most parents. Hence, we caution against overestimating the rates of HPV vaccine hesitancy. The aim of our study was to identify the emerging themes from hesitant parents as an insight into determinants of vaccine hesitancy, and not necessarily to quantify the degree of hesitancy.

5. Conclusion

Despite giant steps taken by the South African government in implementing and financing the HPV vaccination programme, hesitancy against the HPV vaccine is real and the causes need to be actively investigated through local research. This will enable a better understanding of the nature and factors associated with hesitancy. Furthermore, this will ensure that decision makers put in place clear strategies to prevent the occurrence of outbreaks of vaccine hesitancy that have the potential to crumble immunization programmes. Health care providers will also be better equipped to address concerns as they arise. There is a critical need for capaci-

tating health care professionals on the management of vaccine hesitancy [29].

Contributions of authors

AW, SC and CW conceptualised the study. AW and EM extracted and analysed the data. AW prepared the draft manuscript and all authors contributed important intellectual content, read, and approved the final version of the manuscript before submission.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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