

A content analysis of online news media reporting on the human papillomavirus vaccination programme in South Africa

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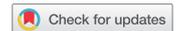
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Background: Cervical cancer is the leading cause of cancer-related deaths among females in South Africa. In 2014 South Africa launched a national human papillomavirus (HPV) vaccination programme for grade 4 girls attending public schools. Approximately 49% of South Africans have access to the Internet and the content and quality of vaccination information could play a role in vaccine awareness and decision-making. This study examined the content, accuracy and tone of online news articles reporting on the HPV vaccination programme in South Africa.

Methods: South Africa national online news sites, online community/regional newspapers and two global aggregated online news search engines (Google News and Yahoo News) were searched for relevant articles using a comprehensive set of keywords. Articles published between January 1, 2014 and June 30, 2015 were assessed for commonly cited sources of information, tone of the headline and article, accuracy of information about vaccine characteristics, South Africa HPV vaccine programmatic details and information on HPV and cervical cancer.

Results: A total of 56 articles were included in the analysis. The majority had a neutral headline tone ($n = 45$) and positive overall article tone ($n = 38$). Information on the dose of HPV vaccine administered during the South African vaccination campaign was accurately mentioned in 38 articles. Twenty articles accurately mentioned the vaccine was efficacious and 12 accurately mentioned herd immunity; however, details on side effects were mostly not mentioned in articles ($n = 8$).

Conclusions: The online media coverage of the South Africa HPV vaccination programme was generally positive with accurate but sometimes incomplete information.

Keywords: cervical cancer, human papillomavirus, online news media, South Africa, vaccine, vaccination

Introduction

Cervical cancer is the fourth most common cancer in women worldwide after breast, colorectal and lung cancers. As of 2012, approximately 87% of deaths from cervical cancer occurred in less economically developed countries with the highest incidence rates reported in sub-Saharan Africa.^{1,2} In South Africa, cervical cancer is the second most common cancer in women (with an age-standardised incidence rate of about 24 per 100 000)^{3,4} and is the leading cause of cancer deaths among women.⁵ Human papillomavirus (HPV) has been identified as a causal agent of cervical cancer.⁶ The development of a vaccine against HPV offers potential benefit for primary prevention of cervical cancer.² Both the bivalent and quadrivalent vaccines are safe and highly efficacious.⁷ Minor side effects reported include vaccination site pain,^{8,9} redness, swelling and fever.⁹ Although some groups have raised concerns about the HPV vaccine increasing sexual promiscuity,^{10,11} research has shown that vaccine recipients (13–21 years) did not demonstrate a change in sexual behaviour six months after vaccination relative to unvaccinated girls.¹² Other concerns raised about the HPV vaccine include adverse effects such as dizziness, nausea and fainting,¹³ vaccine safety and the effects on female fertility.¹⁴

More than 100 countries have included the HPV vaccine in immunisation programmes.^{15,16} In 2014, South Africa introduced a national HPV vaccination programme as part of the Integrated School Health Program. The vaccination programme targets all

grade 4 school girls (ages nine and above) attending public schools (i.e. schools that are governed by the state).^{17,18} In 2014, the programme offered two doses of the bivalent vaccine free of charge, given six months apart, following written parental consent.

The role of media in vaccination programmes has been documented in the literature. A study by Ma *et al.*¹⁹ illustrated that the Internet, print, radio and television coverage of influenza cases increased vaccination in children in the United States of America, while uptake of the measles, mumps and rubella (MMR) vaccine was shown to decline by 13.6% in Wales with anti-vaccine campaigns in the media.²⁰ Evidence from developed countries indicates that the use of the Internet for health-related topics is on the rise as 32% of American adults looked for health information online in 2012 and the Internet has become a preferred source of information on HPV vaccines.^{21,22} Researchers evaluated the content and accuracy of HPV information in online news in Romania after two national school-based vaccination programmes failed (2.57% of 110 000 eligible school girls were vaccinated)²³ and found that 28% of online articles contained negative information concerning vaccination and also contained inaccurate information.²⁴ A study in the United States assessed the content and accuracy of online news on HPV after the Gardasil vaccine, the first vaccine introduced in North America,²⁵ was licensed and results revealed that 50% of the 200 articles had a neutral tone (not in favour or against vaccination). In addition, it was

revealed that media coverage repeatedly lacked comprehensive information on the vaccine, HPV and cervical cancer.²⁶ Although these studies did not directly assess the causal relationship between media coverage and vaccine uptake, it was postulated that the lack of clear and comprehensive information presented in the media might have led to increased public uncertainty regarding the vaccine.²⁴⁻²⁶

In South Africa, almost half of households have at least one member of the family with Internet access either at home, work, place of study or at Internet cafés,²⁷ therefore the content and quality of the vaccination information presented in online media news could influence public awareness and decisions regarding vaccination. The aim of this study was to assess how online news available in South Africa presented HPV vaccines to the public and how the HPV vaccination programme was described during the period immediately before the first round of the vaccination programme (January 2014) and throughout the vaccination period to 30 June, 2015. To date, HPV vaccination coverage in the South Africa media has not been examined.

Methods

A descriptive content analysis of information provided on the HPV vaccine, cervical cancer and the South Africa campaign national HPV vaccination programme, as well as the headline and article tone in online news articles, was conducted. The analysis was guided by the Affect Heuristic Conceptual Framework.^{28,29} The manner in which risk is communicated has been shown to influence how risks are perceived.²⁸ Affect heuristic posits that people have negative or positive degrees of affect associated with perceived risks that determine decision behaviour.²⁹ In the case of the HPV vaccination programme, the affect is likely influenced by perceived risks of HPV vaccination in young girls.³⁰ Previous content analyses of online media content of HPV vaccination indicated that articles with anti-vaccination messages had inaccurate vaccine information, which could lead to false perceived risks and decision behaviors.²²

Website traffic estimates from Effective Measure were used to determine the most visited South Africa online news sources during the study period based on the number of unique browsers. Effective Measure is the official traffic measurement partner of the Interactive Advertising Bureau (IAB), a marketing institute that tracks website traffic in South Africa. A total of 520 online news websites were identified. All duplicate news websites, non-English sites, sites with broken uniform resource locators (URL), and non-news websites such as radio stations, sports and entertainment websites were removed. The South African Government Communication and Information Systems website was used to categorise the remaining websites into national South Africa online news sites (e.g. News24, Times Live), and online versions of community/regional newspapers (e.g. Sandton Chronicle, IOL News). In addition, two global aggregated online news search engines, Google News and Yahoo News, were included as sources of online news. These aggregated news websites collect news articles from a variety of websites and often summarise these in a pre-defined or user-defined format.³¹

A total of 110 news websites were identified and a search was conducted to identify relevant articles during the time period of interest. A comprehensive set of key search words was formulated by consolidating previous content analysis studies investigating HPV in the media.³²⁻³⁶ The following terms were used: 'HPV vaccine' OR 'cervical cancer vaccine' OR 'human papillomavirus vaccine'

OR 'human papilloma virus vaccine' OR 'HPV immunization' OR 'human papillomavirus immunization' OR 'STI vaccine' OR 'STD vaccine' OR 'HPV vaccination program' OR 'HPV vaccination campaign' AND 'South Africa' OR 'SA'. The search strategy was standardised by applying the terms to the Google advanced search feature and restricting the domain feature on Google to the website of interest. Articles published from January 1, 2014 to June 30, 2015 were reviewed. The process to identify relevant online news articles is outlined in Figure 1.

Articles were included in the analysis if they directly addressed HPV or cervical cancer vaccines or the South Africa vaccination programmes. After duplicates were removed, articles were excluded if they were videos, made no mention of HPV vaccines, or briefly mentioned HPV or cervical cancer vaccines (i.e. < 100 words). The resulting 56 articles were then evaluated by two researchers, SAD and VS, to ensure inclusion and exclusion criteria were uniformly applied throughout.

Variables evaluated for content accuracy included vaccine characteristics such as efficacy and side effects; and South Africa vaccination campaign programmatic information such as the name of vaccine, dosage, vaccine administration details, target population and reasons for vaccination. The variables were coded as 'mentioned accurately' or 'mentioned inaccurately'. HPV and cervical cancer information and concepts such as epidemiology, aetiology and association with HIV were assessed to determine whether they were mentioned. The variables were coded as 'mentioned' or 'not mentioned'. Headline and article tone towards vaccination were assessed as positive (recommended HPV vaccination), negative (did not recommend HPV vaccination), neutral (neither recommended nor opposed HPV vaccination) or mixed (both recommended and did not recommend HPV vaccination). Additional information such as the date of publication and sources of information cited in the articles were also recorded. A pilot of 9 out of 56 articles was conducted to assess feasibility and validity of the database used for data extraction; this was created using Microsoft Access 2013 (Microsoft Corp, Redmond, WA, USA). All articles were coded by one researcher (SAD) and 33% of the articles were randomly selected and coded by a second researcher (VS)

Two rounds of coding were conducted to minimise errors and a consensus on coding output was reached, following discussions

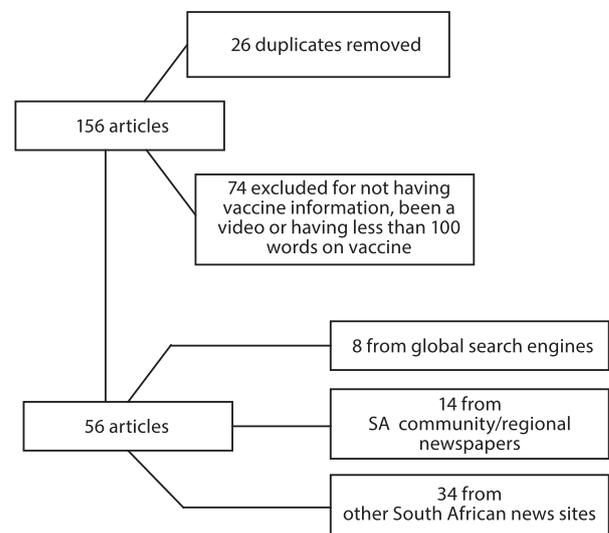


Figure 1: Identification of articles on HPV vaccination programme in South Africa.

between coders. A kappa measure for inter-coder reliability agreement was calculated. The kappa was calculated for headline tone, article tone and target group in South Africa campaign. The kappa coefficients were 0.95, 0.92 and 1 and the percentage reliability measures were 98%, 96% and 100% respectively. A descriptive analysis of the content, tone and accuracy of information in the articles was conducted. Fisher's exact test was used to assess the differences in headline tone and article tone across the different types of online media. The analysis was performed using STATA 13.0 (StataCorp LP, College Station, TX, USA).

Results

There were 56 online articles published across global aggregated, national South Africa, and community/regional online news sites between 1 January, 2014 and June 30, 2015. Figure 2 shows the number of articles published and the corresponding vaccine campaign events during this time period.

Articles cluster around important dates related to the HPV vaccination programme. These include the announcement by the Minister of Health about the HPV vaccination programme on January 16, 2014, year 1 round 1 (March 3, to April 11, 2014), year 1 round 2 (September 29, to October 31, 2014), and year 2 round 1 (February 23, to March 20, 2015). Half (n = 28) of the articles were published before, during and after the administration of the first dose of year one of the programme (January–April 2014). No articles were published between May and July 2014. Online news reporting resumed in late July 2014 to September 2014 preceding and following the second round of vaccinations (n = 8). During November 2014, there were three articles reporting on the outcomes of a law suit filed by a parent against the National Department of Health who claimed that her child was vaccinated without parental

consent. There was an increase in the frequency of articles during February to April 2015 corresponding to the first round of vaccinations during the second year of the programme.

The tone of headlines and articles was categorised as neutral, positive, negative or mixed. The headline and article tone was assessed across global aggregated news sites, national South Africa news sites and community/regional news sites (Table 1). The headline tone of the majority 80% (45/56) of articles was neutral and the bulk 64% (29/45) of these articles were published on national South Africa online news sites. Two of the four articles with negative headline tone were published on community/regional news sites. The majority 68% (38/56) of articles assessed had a positive tone regardless of headline tone and no articles assessed had an overall negative tone. None of the articles had a mixed headline tone. There was no association between headline tone and the type of online media (p = 0.25, Fisher's exact test), or between article tone and type of online media (p = 0.64, Fisher's exact test).

The main sources of information cited in articles across online news media platforms included the National Department of Health of South Africa 75% (42/56), health professionals such as physicians and researchers 50% (28/56), vaccine manufacturers 9% (5/56), South Africa Department of Education 20% (11/56), scientific literature 11% (6/56), public figures 11% (6/56), Centers for Disease Control 13% (7/56), World Health Organization 13% (7/56) and cancer centres such as the Cancer Association of South Africa (CANSA) 13% (7/56). A total of 55% (31/56) of articles that cited the South Africa Department of Health had a neutral headline tone and 52% (29/56) had a positive article tone.

Table 2 summarises information mentioned in online news articles related to cervical cancer, HPV and accurate vaccine

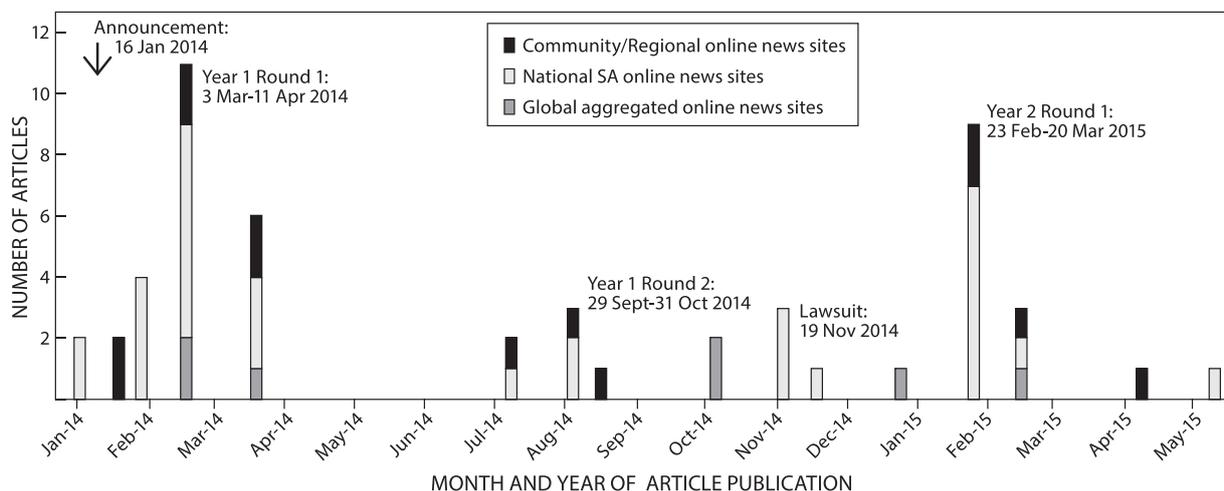


Figure 2: Number of HPV articles published in online news media during the HPV vaccination campaign in South Africa.

Table 1: Headline and article tone

Type of online media	Positive tone		Negative tone		Neutral tone		Mixed tone	
	Headline	Article	Headline	Article	Headline	Article	Headline	Article
Global aggregated online news (n = 8)	0	7	1	0	7	1	0	0
South Africa online news (n = 34)	4	23	1	0	29	10	0	1
Community/regional (n = 14)	3	8	2	0	9	5	0	1
Total (N = 56)	7	38	4	0	45	16	0	2

Table 2: Frequency of cervical cancer, HPV and vaccine information mentioned in online news articles

Information presented	Number	%
1. Information on cervical cancer		
Epidemiology	39	70
Aetiology	45	80
Prevention	55	98
2. Information on HPV		
Epidemiology	41	73
Risk factors	4	7
HPV/HIV relationship	13	23
3. Vaccine information		
Vaccine described as efficacious/effective	20	36
Vaccine described as safe	8	14
Side effects—fever	1	2
Side effects—nausea	1	2
Side effects—headache	1	2
Side effect—swelling	1	2
Side effects—redness	1	2
Mild side effects	3	5
Vaccine labelled as ‘cervical cancer vaccine’	13	23
Vaccine labelled as ‘HPV vaccine’	51	91
Vaccine manufacturer mentioned as ‘Gardasil’	5	9
Vaccine manufacturer mentioned as ‘Cervarix’	11	20
Vaccination will provide herd immunity (unvaccinated is protected)	12	21
4. Concerns raised about the vaccine		
Fertility concerns	3	5
Increased sexual promiscuity	6	11
Safety concerns	5	9
Other	13	23

characteristics. Most articles mentioned cervical cancer prevention, aetiology and epidemiology. The majority of articles (73%, 41/56) mentioned HPV epidemiology and the relationship between increased risk of HPV infection in HIV-positive individuals (23%, 13/56) but only 7% (4/56) of articles mentioned other risk factors for HPV. Twenty articles (36%) mentioned accurately that the vaccine was efficacious, and 21% (12/56) accurately mentioned the potential benefits of herd immunity. The majority of articles referred to the vaccine as the ‘HPV vaccine’ (91%, 51/56) and some articles mentioned the name given to the vaccine by the manufacturers, Gardasil (9%, 5/56) and Cervarix (20%, 11/56). Parental and general public concerns mentioned in online news articles ranged from issues related to fertility (5%, 3/56), sexual promiscuity (11%, 6/56) and vaccine safety (9%, 5/56).

Table 3 outlines the accurate reflection of programmatic information included regarding the South Africa HPV vaccination programme by media type. Articles accurately mentioned that two doses will be administered in the programme (68%, 38/56), 6 months apart (55%, 31/56) to school girls in grade 4 (71%, 40/56) and in state-governed schools (73%, 41/56). Parental consent was mentioned in 46% (26/56) of articles and the purpose of the programme (i.e. to vaccinate girls before HPV infection occurs) was mentioned in 86% (48/56) of articles. The target population was accurately mentioned in 6 articles from global aggregated online news sites, 22 articles from national South Africa online news sites and 12 articles from

Table 3: Information outlining the South Africa HPV vaccination programme in news articles by online news media type

	Global aggregated online news sites	National South Africa online news sites	Community/Regional online news sites
Programme information (n = 56)	Number of articles	Number of articles	Number of articles
Two doses of vaccine given (n = 38)	6	21	11
Doses were 6 months apart (n = 31)	5	18	8
Targeted population were grade 4 girls (n = 40)	6	22	12
State governed (public) schools were involved (n = 41)	5	24	12
Parental consent was required (n = 26)	3	13	10
Reasons for the vaccination programme (n = 48)	6	29	13

community/regional online news sites. Parental consent was mentioned as a prerequisite for vaccination in 3 articles from global aggregated online news sites and in 13 and 10 articles from national South Africa online news sites and community/regional online news sites respectively.

Discussion

To the best of our knowledge, this is the first study examining online news media coverage of the HPV vaccination campaign in South Africa during the period immediately before the first round of vaccination (January 2014) and throughout the vaccination period, to June 30, 2015 using the Affect Heuristic Conceptual Framework. In this study, the frequency of online news articles coincided with important programmatic dates with most of the articles published before, during and after the first round of the vaccination programme (year one). The headline tones were mostly neutral and overall article tones were positive and encouraged vaccination. Our finding of mostly positive article tone is in contrast to findings of mainly neutral article tones reported in a study by Habel *et al.* in the United States in 2009.²⁶

The National Department of Health of South Africa, researchers and physicians were highly cited sources of information in the articles assessed in this study, which suggests that the online news media engaged closely with experts in the field to generate articles informing the public on HPV vaccination. In addition, we evaluated the accuracy of the vaccine characteristics as well as the South Africa HPV vaccination campaign details mentioned. Although the vaccine was stated as effective, the safety of the vaccine and side effects were rarely mentioned in the articles (36%), in contrast to a previous study that had about 48% of articles mentioning the safety and efficacy of the vaccine.³⁶ This means that the information provided to the members of the public was limited and may affect their

acceptance of the vaccine as posited by the affect heuristic framework. Although a number of articles encouraged vaccination, herd immunity was rarely mentioned. Herd immunity is an important public health benefit of vaccination because a community vaccinated against an infectious disease is protected due to the reduced risk of an epidemic. This is an important information gap in the articles, considering the potential appeal to social altruism to reduce the prevalence of cervical cancer in South Africa via the national vaccination campaign.

The manner in which the vaccine is labelled affects the public perception and acceptance of the vaccine and could impact on vaccine uptake.^{26,32,33} With the vaccine preventing against other types of cancers,² labelling it as a 'cervical cancer vaccine' for example may present a limited perception of the function of the vaccine. In contrast to previous content analyses on HPV vaccination,^{26,33} we found that the vaccine was labelled as 'HPV vaccine' in the majority of articles and not as a 'cervical cancer' vaccine. Information coverage of the vaccination campaign itself largely pertained to reasons for the vaccination programme, the targeted schools and student population, as well as the dosage of the vaccine provided. The provision of this type of information not only made information on the campaign itself available but can also be seen as a means of transparently elucidating details of the process of the vaccination programme to South African parents to appeal to them to have their children vaccinated. In addition, the coverage of the campaign information was similar across the different types of online news articles and showed efforts to cover the South African vaccination programme in detail irrespective of the type of online news article. The breadth of this coverage is essential to disseminate vaccination information to members of the public in South Africa, regardless of their source of online news, in order to potentially encourage higher HPV vaccination uptake.

The study is not without limitations, such as the fact that this content analysis is limited to online media news sites that might be accessed by 49% of South Africans, and does not take into account the potential influence of other media platforms such as social media. Other limitations include analysing only articles that were written in English and no other languages spoken in South Africa. Additionally, with a small sample size ($n = 56$), it is possible results that were not statistically significant may have achieved significance with a larger sample size. Despite these limitations, we believe this study adds to the growing body of content analyses conducted on online media coverage of HPV vaccination.

Conclusions

In conclusion, this study builds on current literature on the role of online news media in HPV vaccination in South African online news, community/regional online news and global aggregated online news, and found no association between the type of article source and the tone of the article and headline. The overall article tone was positive and encouraged vaccination. Additionally, the online media coverage of the South Africa HPV vaccination programme presented accurate but sometimes incomplete information.

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Ethical considerations – No ethical clearance was required for this study.

Authors' contributions – All the authors contributed to the manuscript in the following capacities: study conception and design—Sharon Attipoe-Dorcoo, Vedantha Singh, and Jennifer Moodley; method development—Sharon Attipoe-Dorcoo, Vedantha Singh, and Jennifer Moodley; acquisition of data—Sharon Attipoe-Dorcoo and Vedantha Singh; analysis and interpretation of data—Sharon Attipoe-Dorcoo, Vedantha Singh and Jennifer Moodley; drafting of manuscript—Sharon Attipoe-Dorcoo, Vedantha Singh, and Jennifer Moodley; critical revision—Sharon Attipoe-Dorcoo, Vedantha Singh, and Jennifer Moodley.

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