Mass media coverage of HPV vaccination in Romania: a content analysis

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Abstract

Romania has the highest cervical cancer burden in Europe. Despite the implementation of two human papillomavirus (HPV) vaccination programmes, the uptake remained extremely low and the programmes were discontinued. Given that media are a common source of information for the public and may influence vaccination decisions, this article sought to explore the content and quality of HPV vaccine media coverage in Romania. We conducted a content analysis of 271 media reports (from newspapers, magazines, videos and informational websites) published online between November 2007 and January 2012. Overall, results indicated that 31.4% of the materials were neutral, 28% were negative or extremely negative, 17% were mixed, while 23.6% were positive towards the vaccine. The most dominant vaccine-related concerns were side effects and insufficient testing. Elementary information about the vaccine and HPV was constantly left out and sometimes inaccuracies were found. Negatively disposed reports were more likely to contain incorrect data about vaccine efficacy and less likely to provide comprehensive information about the vaccine and HPV-related diseases. Some dimensions of media coverage varied across time and media outlets. The present findings suggest that educational interventions are greatly needed as a response to suboptimal and incomplete media coverage of HPV vaccination.

Introduction

Cervical cancer burden and the introduction of human papillomavirus vaccines in Romania

Although cancer of the cervix is highly preventable, it remains the third most common ‘frequent’ cancer among women worldwide, resulting in almost 270,000 deaths annually. More than 85% of the cases are recorded in low income and developing countries [1].

Of particular significance is Romania’s situation, where cervical cancer represents a serious public health burden. Romania has the highest cervical cancer incidence (28.6/100,000) in Europe and for the last two decades, it has had the highest cervical cancer mortality on the continent, with rates 6.3 times higher than the average of European Union (EU) countries [1, 2]. Particularly, the standardized mortality rate for 2010 was 10.42 (ages 0–64/100,000), compared with 0.68 in Italy [3]. Estimates indicate that, in Romania, every year ~4343 women are diagnosed with this malignancy and almost 2000 die from the disease [1, 2]. Furthermore, cervical cancer is the first cause of death by cancer in Romanian women for the 15–44 age group [1, 4], which is clearly a reason for concern. This situation is partly due to challenges in designing, implementing and sustaining a national organized cervical screening programme [5]. In fact, Romania did not have a nationwide, population-based screening programme until 2012, when a
National Programme was implemented for women aged 25–64. Therefore, the attendance rate in opportunistic screening has been very low. For instance, previous work has found that only 20.2% of a national representative sample of Romanian women reported that they had ever had a Pap test [6–8].

In light of these statistics, promoting and implementing effective technologies to prevent cervical cancer remain crucial topics. In 2006 and 2009 respectively, two human papillomavirus (HPV) vaccines, Gardasil/Silgard (Merck & Co., Inc.) and Cervarix (GlaxoSmithKline, GSK) were licensed by the US Food and Drug Administration. GSK’s bivalent vaccine prevents against genotypes 16 and 18, considered responsible for ~7 out of 10 cases of cervical cancer, whilst Merck’s quadrivalent vaccine additionally targets HPV6 and HPV11, the latter strains causing genital warts. Recommendations for females are for vaccine to be administered routinely at the age of 11 or 12 with catch-up programmes up to the age of 26 [9, 10]. Gardasil is also licensed for males and the US Advisory Committee on Immunization Practices recommended routine use for males aged 9–21 [11].

Clinical trials have concluded that both vaccines are very effective at preventing the HPV infection [12–15]; thus, immunization has the potential to prevent HPV-related diseases. Although the most important implications are for cervical cancer prevention, HPV can also cause other anogenital cancers such as anal, vaginal, vulvar and penile cancers and a subset of head-and-neck cancers [16–18].

By May 2012, 19 EU countries have implemented HPV vaccination programmes [19]. In 2008, the Romanian Ministry of Health rolled out a school-based immunization campaign providing free vaccines for 10- to 11-year-old girls who have received written parental consent. Both vaccines were included in the programme, with some schools using Silgard and others using Cervarix. Statistics revealed that only 2.57% of the 110 000 eligible girls were vaccinated [20]. Starting with 2009 an information campaign was launched, followed by a second vaccination programme, targeting 12- to 14-year-old girls. Moreover, a catch-up programme was made available, as adult women were given the opportunity to get the vaccine free of charge through their health provider. Despite the accessibility of the vaccine, initiation remained low and the school-based programme was discontinued. The interplay between high cervical cancer mortality, high vaccination access and compromised uptake rate makes Romania an interesting case, especially given that the other countries that used school-based vaccine delivery have generally reported higher coverage rates. For instance, in the United Kingdom, Portugal and Australia, the uptake rates were ~80% or higher [19, 21].

Mass media and vaccines: an overview

It is well-known that the experience of society dynamics, including the introduction of new medical practices is partly mediated by mass media [22, 23]. Given that communication via media is a common practice, it is important to explore media representations of vaccines.

Consistent with the influential role of the media on health behaviours, previous research has shown that negative portrayal of the measles, mumps and rubella and the pertussis vaccines created controversy and, as a result, an increasing number of parents declined vaccination for their children [24–28]. Studies found that exposure to news media was associated with HPV vaccine awareness [29] and that respondents’ representations of HPV were very similar to the content analyses of media coverage of HPV, suggesting media influence [30]. Gainforth and Latimer [31] showed that women who received high-risk information about the HPV vaccine were less motivated to be vaccinated compared with women who received low-risk information and posited that negative media can have a deleterious impact. Moreover, it has been documented that accessing vaccine-critical websites just for a few minutes amplifies the perception of vaccination risk and decreases intentions to vaccinate [32]. Additional evidence was provided by an experimental study showing that exposure to negative blogs about the HPV vaccine leads to higher vaccine-related risk perception and reduced intentions to get the vaccine, whereas exposure to
positive blogs did not have an influence [33]. Furthermore, one study concluded that even ‘balanced’ media reporting (presenting claims both for/against an autism-vaccine link) negatively influenced judgements of risk and vaccination intentions [34]. Besides, some recently published research has found that media coverage of the HPV vaccine and Internet search activity may promote increased adverse event reporting [35]. Nonetheless, some articles [36, 37] indicated an association between using media and online reports as sources of information and higher knowledge regarding HPV. Similarly, another study found that a media information campaign increased knowledge levels and pneumococcal vaccination uptake [38]. Thus, previous research highlights the complex implications of media coverage, suggesting that we have to acknowledge media as a potential determinant of public’s views and health behaviours. These studies also reiterate the importance of examining media content on HPV vaccines.

There is a sizeable literature on HPV vaccines portrayal in the international media. Several studies were published in which representations of the HPV vaccine in the traditional and/or new media were investigated in the United States [39–51], Canada [51], Australia [52], United Kingdom [53, 54], Germany, Spain [55] and Italy [56]. Studies have shown that in the United States most articles regarding the vaccine are written in a neutral tone, whereas in the United Kingdom they are generally written in a positive tone. However, some concerns were raised regarding potential negative effects of immunization on subsequent sexual behaviour [54]. Although there are important variations, one consistent aspect that emerged across the majority of studies is that media coverage is incomplete and suboptimal. For instance, information about the necessity of future screening practices was often left out [42, 46, 52].

Theoretical background and aims of the present study

According to the ‘affect heuristic’ [57, 58] and the ‘risk-as-feelings’ hypothesis [59], affect plays an influential role on judgements and decisions. These theoretical frameworks are similar and claim that feelings are used as information in the decision process. Specifically, the affect heuristic assumes that when making a decision, people access an ‘affect pool’ containing the positive and negative feelings associated with the decision alternatives and they subsequently use these feelings as a cue to estimating their personal risk [58]. Similarly, the risk-and-feelings hypothesis highlights the role of affect experienced at the moment of decision making and claims that emotional reactions can drive behaviour [59]. Hence, these perspectives suggest that accessing vivid, negatively toned stories about vaccination can lead to strong affective reactions and to a heightened vaccine-related risk perception, which in turn will guide decision.

According to Tversky and Kahneman’s ‘availability heuristic’ [60], individuals sometimes make judgements using the information that is most readily remembered, which in this case might be information conveyed by mass media. As noted earlier, accumulating evidence has shown that media reports do not necessarily provide accurate and complete messages about HPV vaccines. Thus, inadequate reports about the HPV vaccine could contribute to erroneous decisions. For instance, some people might overestimate the probability of vaccine-related adverse effects after accessing salient, highly publicized negatively toned news stories, which might result in avoidance of vaccination.

It is also important to note that classic research in cognitive psychology has shown that both true and false information are initially represented as true by the human mind [61]. In other words, this thesis suggests that people seem to be prone to believe the information with which they are presented, as it is only in a second stage that the veracity of information is thoroughly assessed (and subsequently some ideas may be re-represented as false). If something interferes after the initial stage (e.g. competing tasks, time pressure), people could be misled. This would be problematic if media depictions were inadequately representing the HPV vaccine. To sum up, these lines of research highlight the potential implications of media coverage and emphasize the
relevance of exploring the media content about the HPV vaccines.

The way the vaccine is framed by the media in different social contexts is an important area to study. However, to our knowledge, no content analyses investigating media’s representations of the HPV vaccine have been performed in Eastern European countries, particularly in those countries with high HPV-related cancer rates. Accordingly, the purpose of the present study was to address this gap by exploring the content and quality (accuracy of information) of HPV vaccine media coverage in Romania. Identifying media content could give us an insight on the type of information made available to the public and on the local meanings that were created and disseminated.

Specifically, our main research questions are: (i) What is the tone of media materials toward HPV vaccination?, (ii) Do the media provide complete and accurate information about the HPV vaccine? (iii) Are there significant trends in media coverage of the above issues by time or by media outlet?

Method

Using Google search engine, we selected 271 Romanian media reports related to the HPV vaccine.

Search strategy and data collection

Our web-based search typology was motivated by several reasons: (i) online press has gained popularity and most newspapers have online editions; (ii) ~58% of Romanian adults have Internet access at home and 73% of all Internet users report reading online news and newspapers, a percentage that surpasses EU average and is the most common online activity in Romania [62, 63]; (3) Google has the highest news coverage and is the most popular search engine by far, with a market share of >94% in Romania [64]. Thus, this method reflects our intention to select the most readily accessible sources, as Google provides items that Romanian people looking for information about the vaccine would most likely find.

We searched Google (www.google.com) weekly, starting 1 October 2011 through 31 January 2012, to locate content related to the HPV vaccine. The search terms were ‘HPV vaccine’ and ‘cervical cancer vaccine’. Our search was confined to materials in Romanian, published online between 1 November 2007 and 31 January 2012. The rationale for selecting this time frame was to capture the period when the HPV vaccine started to receive media attention shortly after the availability in Romania, to include the months following the launch of the national campaigns and also the period after the programmes were ended. In this way, we could monitor the dynamic process and identify trends in reporting.

After we scrutinized the results returned by Google, we decided to monitor and retain the first 25 pages. We employed this strategy for several reasons: Google sorts the pages by relevance and ranks them accordingly, thus these first pages represented the top search results and had the highest visibility for the public. Moreover, it is well known that people usually choose only the first results displayed by search engines [65].

Data selection

We considered that a more complex understanding of the nature of HPV vaccine information could be attained by exploring various types of media sources. Therefore, the following four online media outlets were considered eligible: newspapers, magazines, videos (audio visual information) and informational websites. The ‘websites’ category included: (i) health-related and medical websites targeting a general audience and news-specific websites (together, these represented ~70% of the websites’ sample) and (ii) websites from associations, non-profit organizations and personal blogs (together, these represented ~30% of the sample). The ‘videos’ category included national or local television news reports (~85% of the sample), educational videos (9%) and user-generated content (6%).

Exclusion criteria

Our strategy was to exclude all materials that fell in one of the following pre-defined categories: (i) made
reference to cervical cancer, but not the HPV vaccine or contained less than two paragraphs about the vaccine \((N = 11)\); (ii) were duplications \((N = 8)\); (iii) were published in languages other than Romanian \((N = 4)\) and (iv) were posted on online discussion forums \((N = 5)\). Twenty-eight materials were removed based on these criteria, whereas an additional material was excluded because it was no longer available when we accessed the link. Thus, our final dataset consisted of 271 items.

**Coding scheme**

The analytic strategy included selected codes from previous media analysis research \([42, 44, 46, 55]\) and codes that were created by the authors (M.P., A.B.) after a subsample of 70 national media materials was examined (M.P.) to identify key messages around HPV vaccines. The subsample was part of the final dataset. Additionally, the coding protocol was read and agreed by research collaborators with whom we worked as part of a larger project ‘Psychosocial, Political and Gendered Dimensions of Preventive Technologies in Bulgaria and Romania: HPV Vaccine Implementation’ (2010–12).

The coding instrument was comprehensive and tracked the following variables: the emotional valence of the media material, vaccine label (the term used to describe the vaccine), information about HPV infection, cervical cancer and HPV vaccines and concerns regarding the vaccine. Other characteristics such as readability of the material, sources cited, direct recommendation and focus on personal testimonies were also covered. The content was considered accurate if it respected evidence-based conclusions and guidelines from the following official institutions: Centers for Disease Control and Prevention (CDC), National Cancer Institute (NCI) and the Romanian Ministry of Health (please see the Appendix 1 for a detailed description of the coding scheme).

**Procedure**

Copies of media materials were downloaded from the Internet and included in the analysis. Every media material was coded manually through a pen-and-paper method. Videos were transcribed and the text was analysed according to the same coding scheme. This analysis was performed by the first author in close discussion with the second author. To evaluate inter-coder agreement, another coder (with previous content analysis experience, but who was not otherwise involved in the study and who was blind to the research questions) independently coded a randomly selected subsample of 20% of the materials \((N = 54)\). Percentage agreement and Krippendorff’s alpha coefficient were used to assess inter-coder reliability. Coders had \(\sim 4\) ~h of preliminary training. Inter-coder agreement was high, with a 96% agreement overall, and percentages ranged from good (84%) to perfect agreement (100%). Differences in coding were reviewed and resolved by the first author in discussion with the second coder. Inter-coder reliability as measured by Krippendorff’s alpha \([66]\) was 0.89 across all categories, and coefficients ranged from 0.78 (for tone) to 1.0 (for several variables including: vaccine label, duration, dosing, rationale for target age, background information on HPV and cervical cancer, direct recommendation).

**Data analysis**

Materials were analysed primarily for their manifest content, for what was explicitly mentioned \([22]\). Additionally, we also took into consideration the latent content in the sense that, in cases where rhetoric or irony was used, although the intended message was not directly stated, it could be easily inferred by the reader.

The statistical analyses were performed by using Statistical Package for Social Sciences (SPSS) for Windows Version 16.0 (Chicago, IL). The data were entered into SPSS, and descriptive statistics were run to assess the frequencies and crosstabs. Pearson’s chi-square test was also conducted.

**Findings**

**General characteristics of the sample**

With regard to media outlet, 34% of the sample was taken from newspapers, 9.2% from
magazines, 45% from websites and 11.8% were videos. Media coverage increased after 2007, with the highest number of materials being recorded in 2011 when the majority of reports discussed the campaigns’ failure and another peak took place in 2009 when the information campaign was launched. Most materials had the structure of an informative news story (91.8%) and were coded as easily understandable to a lay audience (98.9%), as the authors avoided highly technical terms (Table I).

**Tone and label**

Overall, results indicated that 31.4% of the materials were neutral towards the HPV vaccine (neither promoting nor opposing vaccination), 17% were mixed (contained both disapproving and approving statements), 28% were negative or disparaging, whereas 23.6% were positive (Table I). We found a significant association between tone and media outlet ($\chi^2(9) = 21.48, P < 0.05$; Table II), with 37.5% of the videos being positively toned, as compared with only 12% of the newspapers.

During 2008, when the vaccination programme was initiated, 55% of the media reports were negative, whereas only 7.8% were positive, with most stories associating the vaccine with frightening adverse reactions. As it can be seen in Fig. 1, after 2010 the frequency of negative reports declined, whereas the neutral and positive reports became more prevalent ($\chi^2(3) = 15.41, P < 0.001$).

Some representative negative titles include: ‘adolescent girl died after getting cervical cancer vaccine’ [67], ‘a 12-year-old girl became paralysed after being injected with the controversial vaccine’ [68]. One example of positive tone is the following excerpt: ‘Cervical cancer vaccine, a success’ [69]. Nonetheless, among positive stories, celebratory language was rarely used. Neutral reports generally provided factual information about the vaccination programme, such as ‘Ministry of Health will re-launch the national vaccination campaign’ [70].

In 61.3% of the titles the vaccine was referred to as a ‘HPV vaccine’; whereas in ~30% it was framed as a ‘cervical cancer vaccine’. However, in the body of the text these labels were used interchangeably.

### Table I. Characteristics of the sample

<table>
<thead>
<tr>
<th>Media outlet</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
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<tr>
<td>Newspaper</td>
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<td>34.0</td>
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<tr>
<td>Magazine</td>
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<td>9.2</td>
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<tr>
<td>Website</td>
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<td>45.0</td>
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<tr>
<td>Video</td>
<td>32</td>
<td>11.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>100</td>
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</table>

<table>
<thead>
<tr>
<th>Year of publication</th>
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</tr>
</thead>
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<tr>
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<td>4.1</td>
</tr>
<tr>
<td>2008</td>
<td>51</td>
<td>18.8</td>
</tr>
<tr>
<td>2009</td>
<td>70</td>
<td>25.8</td>
</tr>
<tr>
<td>2010</td>
<td>26</td>
<td>9.6</td>
</tr>
<tr>
<td>2011</td>
<td>81</td>
<td>29.9</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>3.0</td>
</tr>
<tr>
<td>Not mentioned</td>
<td>24</td>
<td>8.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of material</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>249</td>
<td>91.8</td>
</tr>
<tr>
<td>Argumentative</td>
<td>13</td>
<td>4.8</td>
</tr>
<tr>
<td>Interview</td>
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<td>3.0</td>
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<tr>
<td>Discussion</td>
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<td>0.4</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Tone</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
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<tr>
<td>Extremely positive</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Positive</td>
<td>63</td>
<td>23.2</td>
</tr>
<tr>
<td>Neutral</td>
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<td>31.4</td>
</tr>
<tr>
<td>Mixed</td>
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<td>17.0</td>
</tr>
<tr>
<td>Negative</td>
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<td>14.4</td>
</tr>
<tr>
<td>Extremely negative</td>
<td>37</td>
<td>13.6</td>
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<table>
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<tr>
<th>Label</th>
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<th>%</th>
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</thead>
<tbody>
<tr>
<td>HPV vaccine</td>
<td>166</td>
<td>61.2</td>
</tr>
<tr>
<td>Cervical cancer vaccine</td>
<td>81</td>
<td>29.9</td>
</tr>
<tr>
<td>STD/STI vaccine</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Gardasil</td>
<td>22</td>
<td>8.1</td>
</tr>
<tr>
<td>Cervarix</td>
<td>1</td>
<td>0.4</td>
</tr>
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<table>
<thead>
<tr>
<th>Language</th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Easy to understand</td>
<td>268</td>
<td>98.9</td>
</tr>
<tr>
<td>Difficult to understand</td>
<td>3</td>
<td>1.1</td>
</tr>
</tbody>
</table>

*For each of the variables (media outlet, year of publication, type of material, tone, label, language) the total was $N = 271$. 

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Information about the vaccine

Most reports failed to provide information about key topics such as efficacy, duration and dosing (Table III). Specifically, only 18.5% of the sample correctly presented information about vaccine’s efficacy. Occasionally, we identified misinforming content, such as: ‘The vaccine is totally inefficient’ [71]. We found a significant association between tone and accuracy, with negative reports presenting more incorrect facts about efficacy ($\chi^2(6) = 35.04$, $P < 0.001$, Table II). Media omitted information about vaccine’s extent of protection in >86% of reports and when duration was mentioned, inaccuracies were found. By contrast, information about dosing had a better level of accuracy.

Only 28% of media materials presented complete information regarding the recommended age for HPV vaccination. Many reports mentioned only the age targeted by the school-based programme and omitted information on catch-up vaccination, feasibility of the vaccine for older women and the rationale for target age. Negative reports tended to provide less information about target age and its rationale ($\chi^2(3) = 12.53$, $P < 0.001$). About 14% of the sample discussed feasibility of vaccinating...
boys and 6.3% clarified that the vaccine is not recommended for particular groups, such as pregnant women. Among vaccine manufacturers, Merck was referenced more frequently (10%) than GSK (4.1%).

About 16.6% of the sample compared national HPV vaccination policies with international ones. Although almost 25% of the materials mentioned that the vaccine can be obtained free of charge, five items suggested that the vaccine was forbidden in several Western countries and a couple of items disseminated the false idea that ‘Romania is the only country using the vaccine in a national programme!’ [72].

Information about HPV and cervical cancer

Only 16.6% of the sample provided data about HPV prevalence, whereas <5% pointed out that HPV is asymptomatic and addressed the limited effectiveness of condoms in preventing HPV (Table IV). Thus, data reveal missed opportunities for increasing awareness about vaccine’s utility. Importantly, positively toned reports were more likely to provide information about HPV prevalence compared with negatively toned ones ($\chi^2(3) = 17.36$, $P < 0.001$, Table II). The sexual transmission of the virus was specified in 29.2% of cases, whereas almost 10% of the reports stated that most HPV infections resolve on their own.

Generally, materials were informative about cervical cancer prevalence rate, as 41% of them presented such statistics. Positively toned materials had a higher probability to include such data ($\chi^2(3) = 24.36$, $P < 0.001$, Table II). The causal link between HPV and cervical cancer was the only feature that was addressed by more than half of the reports (53.1%), though only 23.2% of them also mentioned the oncogenic types (i.e. HPV16 and HPV 18). Negative reports seemed to be less likely to present this causal connection ($\chi^2(3) = 8.01$, $P < 0.05$). A few reports contained inaccurate information, such as statements regarding lack of causality between HPV and cervical cancer ($N = 5$) or claims that condoms are very efficient in preventing the HPV infection ($N = 3$).

Alternative strategies for disease prevention (e.g. screening and safer lifestyle) also received notable news reporting. In agreement with other studies, we found that <20% of the reports discussed the need to continue Pap smears post-vaccination.

Overall, findings indicated that most reports contained 3.8 facts about HPV and vaccine (range 0–15; SD = 3.1).

Concerns surrounding the vaccine

The two most frequent concerns that dominated discourses were side effects (discussed in 36.9% of the sample) and insufficient testing that leads to lack of evidence-based information on long-term safety and efficacy (Table V). Particularly, one report titled: ‘Silgard and Cervarix = danger and death? HPV vaccines inflict fear among parents and divide doctors’ [73]. Financial interests of pharmaceutical companies and politicians were also implied, as mistrust in such organizations or individuals was noted: ‘Romanians are no longer willing to accept

<table>
<thead>
<tr>
<th>Vaccine information</th>
<th>Accurate</th>
<th>Not accurate/incomplete</th>
<th>Not mentioned</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Efficacy</td>
<td>50</td>
<td>18.5</td>
<td>51</td>
</tr>
<tr>
<td>Dosing</td>
<td>75</td>
<td>27.7</td>
<td>3</td>
</tr>
<tr>
<td>Duration</td>
<td>23</td>
<td>8.5</td>
<td>14</td>
</tr>
<tr>
<td>Target age</td>
<td>76</td>
<td>28.0</td>
<td>71</td>
</tr>
<tr>
<td>Non-living materials</td>
<td>17</td>
<td>6.3</td>
<td>4</td>
</tr>
</tbody>
</table>

$^a$Total $N = 271$, representing 100% of the total sample.
everything only because it’s free; many persons understand that this is a business’ [73]. Some materials (\(N = 6\)) claimed that pharmaceutical companies, the government and international organizations plan to test the vaccine on Romanian girls, as one article titled: ‘Parents of 4\(^{th}\) grade girls: We don’t want to be guinea pigs’ [74]. A few materials raised concerns that vaccines contain live biomaterials (\(N = 4\)), or that they might lead to promiscuity (\(N = 5\)), whereas others warned that the vaccine causes sterilization (\(N = 8\)).

About one-third of the items reported parents’ views on vaccination, and 91.4\% of these were presented as having a negative or a sceptical attitude, as illustrated by the following headline: ‘Parents massively refused vaccination’ [75]. A significant proportion of the sample (31.4\%) addressed campaigns’ failure, with many articles titling: ‘HPV vaccine, thrown to the garbage: the campaign was a new failure’! [76] or ‘Cervical cancer kills, while HPV vaccines doses have expired in deposits’ [77]. Criticism was raised both at the suboptimal organization of the programme (including wasting scarce financial resources) and at the public’s negative attitudes that dismissed scientific recommendations.

Notably, we found significant trends by time and media outlet related to vaccine concerns. Although websites expressed more concerns regarding the potential interests of the pharmacological companies (‘Big pharma’, \(\chi^2(3) = 13.75\), \(P < 0.001\)), newspapers acknowledged the failure of the national vaccination programmes more frequently (\(\chi^2(3) = 12.84\), \(P < 0.001\)). However, concerns about side effects and insufficient testing were relatively similarly distributed among all media outlets.

Given that negatively disposed reports were more common before 2010, it is not surprising that we also found a significant relationship between vaccine-related concerns and time frame. In particular, concerns about side effects (\(\chi^2(1) = 8.85\), \(P < 0.001\)), worries that recommended age might be too young (\(\chi^2(1) = 9.26\), \(P < 0.001\)) and worries that the vaccine is insufficiently studied (\(\chi^2(1) = 6.56\), \(P < 0.01\)) appeared mostly before 2010.

### Sources cited

The main sources cited were health professionals (29.9\%), the Ministry of Health (29.2\%) and official institutions such as CDC or WHO (17.7\%). By contrast, the two pharmaceutical companies were undercited (3\%). A small, but noticeable, proportion of negative stories (2.9\%) cited religious and professional organizations that launched attacks to local public figures who endorsed the vaccines. Other than that, there were no major differences in terms of the general categories of sources cited across
media types, years or tone. Direct quotes from doctors, researchers or public figures were constantly used (35.1%) both by supportive and by disparaging reports in order to reinforce the credibility of the message. For instance, Geza Molnar, the president of Romanian Society for Epidemiology, was quoted as saying: ‘If I had a 4th grade daughter I would not give her approval for vaccination’ [78].

A total of 9.2% (N = 25) of the sample focused on vivid, personal testimonies in order to provide stronger messages. Although only three testimonies were positive towards the vaccine, the others had a negative valence, presenting particular cases of girls from other countries who suffered serious side effects after receiving the vaccine, such as paralysis or death.

Direct recommendation
A small number of the media stories (2.2%) made direct recommendation in favour of vaccination, whereas 4.8% made recommendation against it.

Discussion
Because their introduction, HPV vaccines have attracted substantial media attention. Implications are important because mass media—as a pervasive source of information—might influence public risk perceptions and decisions about vaccination [30–32]. Given Romania’s high cervical cancer burden on the one hand and extremely low HPV vaccine acceptance on the other, media coverage surrounding HPV vaccine is of particular interest. Therefore, this article sought to illuminate HPV vaccine representations in the national media.

We discuss the main findings in relation to our three research questions.

The first research question asked about the tone of media materials. In answer to this research question, our analysis indicated that the readers were provided mostly with neutral and negative reports about the vaccine. A notable aspect is that media coverage appears to be more negative than in most countries. For example, the percentage of negative newspaper articles is much higher than the one reported for the UK newsprint media (54; i.e. 25% versus 1.4%), and is almost double compared with the one reported by Habel et al. [44] for US media (14.4%). Similarly, the percentage of negative websites appears to be considerably higher than the one for US websites [48; 33.6% versus 7.9%]. Overall, 37 Romanian media materials were extremely negative, whereas only one was extremely positive. Moreover, negatively disposed messages might in itself be more powerful than the positive ones, consistent with the well-known research that claims that ‘bad is stronger than good’ [79]. Often, worries were raised about vaccine’s reported efficacy and safety, with media reporting about girls from Europe and United States who suffered serious damages shortly after vaccination. Similar to Australian media [52], we encountered the concern that the vaccine was being tested on girls, but unlike the UK media [54], the issue of vaccine encouraging promiscuity was less represented. Notably, some issues emerged that have not been reported in content analyses of news media in other countries, such as statements regarding the failure of the national vaccination programmes. Fear that the vaccine might cause sterilization was also identified in a few occasions, though it was not a dominant theme.

One possible explanation for the negative media reporting and for the low uptake may be that discourses were affected by the specific contextual factors of the country under investigation. For example, essential communication opportunities were missed as initially the vaccination programme was not preceded by an information campaign and it was launched in a rush, just 4 days after its announcement and 1 week before the national elections. It is plausible that lack of clear and transparent vaccine-related information might have led to increased suspicion about the vaccine. Furthermore, results might be interpreted considering the existence of both a high level of mistrust in government and pharmaceutical companies and a high dissatisfaction towards the Romanian medical system [80, 81].

The second research question inquired if media provide complete and accurate information about HPV vaccines. In answer to this research question,
we found that, although media materials were easily readable and accessible in terms of completeness, our results resonate with previous research [42, 44]. Moreover, these findings go further, indicating that most reports failed to provide even elementary information on HPV and HPV vaccines, which might have led to several unanswered questions. Nevertheless, statistics on cervical cancer prevalence were slightly better represented compared with some prior studies [44, 47], probably because Romania occupies the first place in Europe in cervical cancer mortality and such data are easily accessible.

Apart from findings that show absence of important facts about the vaccine, this study adds to previous evidence [55] suggesting that, in some occasions, media represents the HPV vaccine incorrectly, primarily through processes of misinformation. We found that negatively disposed reports were more likely to contain some inaccuracies and less likely to provide comprehensive information about the vaccine and HPV-related diseases. Given that many adults get vaccine-related news from the media, this might be particularly detrimental to vaccination-related knowledge and acceptance.

The third research question asked if there were any significant trends in media coverage by time and/or by media outlet. In answer to this research question, results indicated that some dimensions varied by time frame or by type of media. For example, although media coverage was clearly negative in 2008 and 2009, it became more neutral and positive in the following years. The negative pattern corresponded with the announcement and implementation of the school-based vaccination programmes. One possible explanation is that, given the mistrust in the national health system, the introduction of the vaccination programme generated high levels of suspicion regarding the ‘free vaccines’. In terms of vaccine-related concerns, although newspapers were mostly concerned about the failure of the national vaccination programme, websites were more likely to question the interests of the pharmaceutical companies. Taken together, these findings suggest that in order to gain a complete picture of media coverage of vaccination, future work might wish to investigate various types of media outlets over longer periods of time.

Although this article did not test any causal relationship between media coverage and uptake, previous research showed the influence of negative reporting on risk perception. Several approaches grounded in the decision-making literature, such as the ‘affect heuristic’ [57, 58] and the ‘risk-as-feelings’ hypothesis [59], postulate that decisions are emotion based. Thus, following exposure to negatively toned reports and fear-inducing testimonies, the risk of vaccinating might be perceived as higher than the risk of inaction. Furthermore, references about Romanian parents’ reluctance and reports mentioning that most schools were left with large stockpiles of unused vaccines might expose the public to ‘normative’ attitudes, as Forster et al. [53] noted. This is important, especially given that other parents’ opinions seem to be very influential for some Romanian parents [81].

**Limitations and conclusions**

Some conclusions and implications have emerged from our findings and we identify important areas for improvement.

(i) Future educational interventions are crucial in order to support people in making informed decisions about immunization. Efforts should be directed at supplying more information about vaccines (efficacy, duration, catch-up vaccination, providing reasons that justify vaccination at younger ages, need for screening practices, feasibility of vaccine for particular groups, international policies, presenting positive models of countries with high vaccine acceptance), as well as about HPV (transmission and lack of visible symptoms). In this way, people might be more likely to understand vaccine’s benefits and to gain confidence in the vaccination programme. Furthermore, given that statistics are sometimes outperformed by narratives
in terms of persuasiveness [82], if media reports are to produce a greater impact, they might also focus on describing individual cases.

(ii) The results highlight the need for more rigorous standards when communicating about the HPV vaccine. It is particularly important to avoid the transmission of inaccurate information, especially given that it is not easy to reject false information [61]. Improving communication between health officials and mass media [83] might represent a useful strategy. In this way, media could be used to equip the public with evidence-based information about the vaccines.

A number of limitations should be taken into account in order to address opportunities for future work. First, it is important to note that only two search terms were used for identifying media content about the vaccine. Nonetheless, it is unlikely that having used a different procedure would have brought supplementary value. Second, the sample was collected from only one search engine, and yet the one we selected is the most popular among public [64]. Third, as Riesch [84] points out, applying traditional content analysis to online news has its limits, due to the fact that online materials can be updated several times, sometimes without notification and, if this is the case, we cannot know which version people read. However, we do not believe this practice of editing content to have influenced the results in a significant way.

In conclusion, this study extends prior research by providing the first analysis of mass media constructions of HPV vaccination messages in Romania. Another notable advantage of this work is that, unlike most of previous media analyses, we used a more comprehensive approach, as we included different mass media outlets in our analysis in order to provide a complex picture of media coverage and communication patterns. We believe that these findings are of importance to specialists working within the fields of HPV immunization, cancer prevention and public health communication and education.

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Conflict of interest statement

None declared.

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The coding scheme captured:

(i) **General information** about each media material: publication name, date, source (newspaper/magazine/video/website), type of material (argumentative/informative/interview/discussion) and language (difficult to understand = too scientific, with highly specialized terminology/easy to understand = understandable to a general audience).

(ii) The **tone** was classified as: ‘extremely positive’ (extremely supportive of the vaccine)/‘positive’ (favourable towards immunization, supports of the vaccine)/‘neutral’ (informative, neither promoting nor opposing the vaccine)/‘mixed’ (contains both disapproving and approving information, without favouring one side)/’negative’ (unfavourable towards immunization, disapproves of the vaccine)/‘extremely negative’ (extremely unfavourable toward the vaccine).

(iii) **Vaccine label**: as first referenced in the title or the beginning paragraph of the material: as HPV vaccine/cervical cancer vaccine/genital warts vaccine/STD vaccine/by brand name (Gardasil/Silgard or Cervarix).

(iv) **Sources cited**: vaccine manufacturers/speciﬁc medical school or university/General mention of researchers or medical journal/The Ministry of Health/ Cancer centre or research institute/Healthcare professionals/CDC, WHO/News Agency/Other.

(v) Focus on personal testimonies in order to convey messages (yes/no) and their valence: positive/negative.

(vi) **Direct recommendation** or advice for or against the vaccine, such as: ‘Do not vaccinate!’ or Get vaccinated!

(vii) **Vaccine facts and accuracy of information** (whether it presents evidence-based information). Correctness was evaluated according to information provided by CDC (e.g. http://www.cdc.gov/hpv/vaccine.html), NCI and the Romanian Ministry of Health guidelines.

(a) efficacy (accurate/not accurate/not mentioned; criteria for accuracy: the article mentions high protection against 70% of...
cervical cancers and lack of protection against all types of cervical cancers);
(b) dosing: dosing information is considered accurate if the article describes a dosing schedule consistent with a three-shot series at 0, 2 and 6 months (for the quadrivalent vaccine) or 0, 1 and 6 months (for the bivalent vaccine);
(c) duration or length of protection: at least 5–8 years (depending on when the media material was published) and unknown immunity beyond;
(d) the target age and rationale for target age: recommended for girls and young women (9–26 years); + specifying the age targeted in the national campaign (i.e. 10–11 years).
(e) addressability for boys/men—mentions that Gardasil has been licensed for use in males (ages 9 through 26 years); recently has been recommended for ages 9–21; but not included in the national programme.
(f) names of pharmaceutical companies developing vaccines: Merck & Co., Inc. and GSK. Both companies are referenced by name/Merck referenced only/GSK only/no reference to manufacturers;
(g) compares Romanian HPV policy with policy in other countries;
(h) addresses vaccine feasibility for specific groups (e.g. pregnant women);
(i) mentions that the vaccine contains non-living biomaterials.

(viii) HPV and cervical cancer information:
(a) background information on HPV: a1. prevalence; a2. other information (discusses sexual transmission of HPV/non-sexual routes of transmission/mentions that most HPV infections are short-lived/mentions HPV often has no visible symptoms/addresses imperfect effectiveness of condoms in preventing HPV);
(b) statistics on cervical cancer;
(c) links HPV to cervical cancer (mentions HPV as causal agent/mentions carcinogenic types);
(d) discussion of the need for continued Pap test post-vaccination.

(ix) Concerns related to HPV vaccination:
(a) concern that vaccine will increase sexual risk behaviours; (b) safety (side effects or adverse events); (c) concern that recommended age is too young; (d) mandatory school vaccination; (e) explicit mention of parents behaviours or attitudes towards HPV vaccination; (f) affordability (funding mechanisms, cost of vaccine); (g) ‘Big Pharma’; (h) concerns about insufficient testing.

(x) Relevant depictions that did not fit in the predetermined categories were coded in an additional, open-ended ‘other’ category, ensuring that all essential nuances were captured.

(xi) Finally, we assessed the completeness of the information provided, by calculating how many of the above facts regarding HPV and HPV vaccine information were addressed.