Media coverage and public reaction to a celebrity cancer diagnosis

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ABSTRACT

Background Celebrity diagnoses can have important effects on public behaviour. UK television celebrity Jade Goody died from cervical cancer in 2009. We investigated the impact of her illness on media coverage of cervical cancer prevention, health information seeking behaviour and cervical screening coverage.

Methods National UK newspaper articles containing the words ‘Jade Goody’ and ‘cancer’ were examined for public health messages. Google Insights for Search was used to quantify Internet searches as a measure of public health information seeking. Cervical screening coverage data were examined for temporal associations with this story.

Results Of 1203 articles, 116 (9.6%) included a clear public health message. The majority highlighted screening (8.2%). Fewer articles provided advice about vaccination (3.0%), number of sexual partners (1.4%), smoking (0.6%) and condom use (0.4%). Key events were associated with increased Internet searches for ‘cervical cancer’ and ‘smear test’, although only weakly with searches for ‘HPV’. Cervical screening coverage increased during this period.

Conclusion Increased public interest in disease prevention can follow a celebrity diagnosis. Although media coverage sometimes included public health information, articles typically focused on secondary instead of primary prevention. There is further potential to maximize the public health benefit of future celebrity diagnoses.

Keywords cancer, health promotion, screening

Introduction

The reality television celebrity Jade Goody died from cervical cancer on 22 March 2009. Ms Goody’s illness was associated with increased media and public interest in cervical cancer.1 Previous work has shown that a celebrity cancer diagnosis can significantly influence public health behaviour, including the uptake of prevention programmes.2,3

Cervical cancer is a significant public health concern. It is of particular interest as almost all cases are avoidable through preventing infection with the causative agent, human papilloma virus (HPV).4–6 In the UK, the National Health Service (NHS) Cervical Screening Programme (established in 1988) invites women aged 25–64 for regular screening. The programme screened an estimated 78.9% of eligible women in 2008–97 and saves approximately 4500 lives annually.8

This study examines newspaper coverage of Ms Goody’s illness and the extent to which articles conveyed public health messages to support prevention of cervical cancer. It also considers public information seeking behaviour as a reflection of increased awareness and interest in prevention. In particular, Internet search behaviour was used as a measure of public information seeking. Finally, routinely collected NHS cervical screening coverage data were analysed to assess the impact on this element of prevention.
Methods

Separate approaches were used to explore newspaper coverage, Internet search behaviour and cervical screening coverage. Newspaper coverage was analysed to quantify the proportion of articles providing public health information. The frequency of Internet searches for specific health terms was compared against key events in Ms Goody’s illness. Finally, data from the NHS Cervical Screening Programme were examined for any associated increase in screening uptake.


Search terms ‘Jade Goody’ + ‘cancer’ were used to identify all articles covering the story. The search was limited to articles published between 19 August 2008 (date diagnosis first reported) and 31 May 2009 (10 weeks after death). All duplicates were eliminated. Results were further refined using terms potentially indicating a health promotion message: ‘screened’ OR ‘screening’, ‘smear’ (to include ‘smear test’, ‘cervical smear’ and ‘Pap smear’), ‘papilloma’ OR ‘HPV’ (to identify description of infectious aetiology), ‘condom’ and ‘sex’. All articles were independently analysed by two researchers (D.M. and J.P.) to identify genuine messages about cervical cancer prevention. Articles were included when they recommended a method by which individuals could reduce their personal risk (e.g. sexual behaviour, condom use, HPV vaccination or regular smear tests). Simple news reporting (e.g. descriptive articles about the HPV vaccination programme) was excluded and disagreements about the exclusion of articles were resolved through discussion.

To measure public information seeking behaviour, we examined Google searches relating to cervical cancer, cervical screening and HPV vaccination. We used Google Insights for Search, a database of all Google searches which can be analysed by week of access and country of user (http://www.google.com/insights/search). This tool does not provide absolute numbers of searches but a relative figure based on search activity for the time period under study. The week in the selected period with the highest number of searches is assigned the value 100, and other weeks are scaled accordingly. It is a strong indicator of changes in search behaviour but cannot be used to determine absolute search numbers. This database was searched using the following terms: ‘Jade Goody’, ‘cervical cancer’, ‘smear test’ and ‘human papilloma virus’ OR ‘HPV’. Results were analysed for the 12 months between 1 June 2008 and 31 May 2009.

Search data corresponding to the four search terms each formed a discrete time series with 53 equally spaced time points (weeks). In order to test for a relationship between the ‘Jade Goody’ time series and each of the other three time series in turn, the respective cross-correlation functions were estimated. A process of double pre-whitening was first carried out, and each time series filtered using an appropriate model to convert it to approximate white noise, as recommended by Chatfield. This process of ‘double pre-whitening’ helps guard against spurious cross-correlation coefficients which arise from autocorrelations within the individual time series. The analyses were carried out in R version 2.9.2.

Prior to analysis, each time series was subjected to a natural log transformation to make the data more symmetric. To account for zeros, a constant value of 1 was added to the data points before taking natural logs. An investigation of the autocorrelation structures within the time series indicated that a first order autoregressive model should be fitted to each of the ‘Jade Goody’, ‘smear test’ and ‘cervical cancer’ time series to reduce serial correlations (i.e. to reduce them to approximate white noise). First order differencing was used to remove the linear trend from the ‘HPV’ time series. Diagnostic analyses of residuals from each fitted model were undertaken to check that this process of pre-whitening had been successful.

Routine aggregated cervical screening coverage statistics were obtained from NHS Connecting for Health (Exeter).

Results

Newspaper analysis

There were 1203 stories including the terms ‘Jade Goody’ + ‘cancer’ in national newspapers during the period between announcement of Ms Goody’s diagnosis and 10 weeks after her death. Of these, 116 (9.6% of the total) provided information sufficient to infer a method of reducing personal cervical cancer risk. The majority highlighted screening (85.3%). Fewer articles provided advice about vaccination (31.0%), limiting number of sexual partners (14.7%), condom use (6.9%), and smoking (6.0%). These results are summarized in Table 1.
Online health information seeking

The data obtained for each of the four search terms detailed above are shown in Figure 1. There were insufficient searches for ‘human papilloma virus’ on Google Insights for Search which requires a minimum level of activity. Since ‘HPV’ is in general use and has no other common usage, this term alone was analysed. We identified three events publicly announced during the time period analysed: diagnosis on 19 August 2008, terminal prognosis on 14 February 2009, and death on 22 March 2009. These are indicated on the horizontal axis in Figure 1.

A visual examination of the time plots suggests an association between the ‘Jade Goody’, ‘cervical cancer’ and ‘smear test’ search terms with clear peaks at, or just after, the three key events. However, ‘HPV’ searches do not have the same clear relationship. The first major peak in the ‘HPV’ time plot occurs later than the initial peaks for ‘cervical cancer’ and ‘smear tests’ in September 2008, corresponding with the launch of the national immunization programme for girls aged 12–13 and 17–18 across the UK. There is also some suggestion from the ‘HPV’ time plot of a slight increasing linear trend with time.

The cross-correlation coefficients between the pre-whitened ‘Jade Goody’ time series and each of the other three were estimated in turn. Focusing on the cross-correlation coefficients at lag zero, which provide a like-for-like comparison between the time series, the cross-correlation coefficient of ‘Jade Goody’ and ‘smear test’ was 0.583 and the cross-correlation coefficient of ‘Jade Goody’ and ‘cervical cancer’ was 0.703, both statistically significant ($P < 0.05$). In contrast, the cross-correlation coefficient at

<table>
<thead>
<tr>
<th>Information related to reducing cervical cancer risk</th>
<th>Number of articles</th>
<th>Proportion (%) of articles with a public health message ($n = 116$)</th>
<th>Proportion (%) of total articles ($n = 1203$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical screening</td>
<td>99</td>
<td>85.3</td>
<td>8.2</td>
</tr>
<tr>
<td>HPV vaccine</td>
<td>36</td>
<td>31.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Lifestyle (i.e. limiting number of sexual partners)</td>
<td>17</td>
<td>14.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Condom use</td>
<td>8</td>
<td>6.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Smoking</td>
<td>7</td>
<td>6.0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Table 1 Newspaper articles published between Ms Goody’s diagnosis (19 August 2008) and 10 weeks after her death (31 March 2009)

Fig. 1 Frequency of Google searches for specific terms for the 12 month period between 1 June 2008 and 31 May 2009.
lag zero of ‘Jade Goody’ and ‘HPV’ was 0.315 which, although significant (P < 0.05), suggests only a weak relationship.

Cervical screening coverage
Cervical screening coverage (number of women screened in the last 5 years divided by the number eligible) between October 2007 and September 2008 was 78.55% in the 25–64-year-old age group (all ages invited for screening) and 77.85% in the 25–49 year age group (the age band screened at three-yearly intervals). In the year October 2008 to September 2009, cervical screening coverage rose to 78.94% in the 25–64-year-old age group, and 78.53% in the 25–49 year age group. These modest increases are in the context of a trend of decreasing coverage over the last few years, with 2009 showing the first annual increase since 2002. This is illustrated by Figure 2 which shows coverage by quarter for both age bands from the first quarter of 2007 to the third quarter of 2009.

Discussion
Main findings of this study
Our study suggests that Jade Goody’s diagnosis and death precipitated an increase in health information seeking and a modest increase in cervical screening coverage. Internet search patterns were related to this illness as searches for ‘Jade Goody’ peaked at key events in the same way as those for ‘cervical cancer’ and ‘smear test’. As information about Jade Goody’s illness was only publicized through media outlets, changes in Internet and screening behaviour can logically be attributed to news coverage.

The volume of newspaper articles predictably increased following key events in Ms Goody’s illness. However, only a small proportion of those reporting the story included a public health message to readers regarding methods to reduce their risk of developing cervical cancer. Of these, the majority recommended cervical screening. Fewer articles promoted the primary preventive measure of vaccination and very few identified smoking cessation, barrier protection or other lifestyle changes.

What is already known on this topic
As the Internet emerges as an increasingly important tool for accessing health information, data captured by routine sources (e.g. social networking sites and search engines) are used more frequently to inform public health policy. The term ‘infodemiology’ describes the ‘science of distribution and determinants of information in an electronic medium, specifically the Internet, or in a population, with the aim of informing public health and public policy’.

Many studies have found that Internet users’ online behaviour can be used to track patterns of health. For example, Google search results predict influenza outbreaks 1 week before reporting by sentinel physicians. Similarly, analysis of online sources identified an outbreak of severe acute respiratory syndrome in China 2 months before announcement by the World Health Organization and Canadian searches for ‘listeriosis’ spiked almost a month before official announcement of an outbreak in 2008. Yahoo! search activity correlates strongly with national incidence and mortality of specific cancers. A number of reports suggest relationships between media reporting and Internet searches. Newspaper reporting can also generate intense public interest in health issues.

Media handling of health issues can change health behaviours. For example, fictional portrayals of suicide have been associated with hospital presentations of deliberate self-harm and Nancy Reagan’s decision to undergo a mastectomy in 1987 was followed by a 25% reduction in women choosing breast-conserving surgery. Media opposition to hysterectomy in Switzerland led to a 25% reduction in one region while rates increased in an area not reached by the campaign.

Public diagnoses can also have important public health consequences. Linda McCartney’s death from breast cancer in 1998 preceded a 64% increase in calls to the cancer charity CancerBACUP. These effects can impact on national screening programmes. For example, a prominent broadcast journalist undergoing a televised colonoscopy led to a greater than 20% increase in uptake of screening colonoscopies in the USA. Kylie Minogue’s diagnosis in 2005 preceded a 20-fold increase in news reporting about breast cancer and a 40% increase in mammography screening.
This effect was accompanied by a 20% increase in uptake of breast cancer screening in the UK.\textsuperscript{3} In 2001, a storyline in the British soap Coronation Street was associated with a significantly increased cervical screening coverage in the North West of England.\textsuperscript{30}

**What this study adds**

Our study shows that public information searching behaviour and interest in screening are associated with key events in a high-profile celebrity illness. This suggests a role for the media in influencing public health information seeking. However, our study also shows that news articles frequently neglect health promotion messages when reporting details of a celebrity illness. Fewer than 10% included a public health message with potential to reduce the cervical cancer risk of individual readers. When health messages are included, they appear to be influenced by editorial priorities. In this case, newspapers were most likely to advise cervical screening and HPV vaccination, both issues of controversy and perceived public interest. Alternative health promotion strategies (e.g. condom use) received very limited news reporting.

Health promoters should not rely on popular media sources to maximize the public health potential of celebrity illness. Instead, they should react promptly to future celebrity diagnoses to maximize public health opportunities through working with news organizations. As celebrity illness can precipitate increased online searching for health terms, this reaction should include making timely, effective and reliable advice available to online health information seekers.

**Limitations of this study**

The present study had some limitations. Internet search statistics were derived from only one search engine, although Google does account for 87% of UK Internet searches.\textsuperscript{31} The Internet is not the only tool for locating health information but it is an important source of information for patients in a variety of healthcare settings.\textsuperscript{32,33}

Our study used newspaper reporting to measure media coverage of Jade Goody’s illness. It did not consider other media sources (e.g. television, radio, magazines and online news outlets) which could have influenced public interest in cervical screening. However, the newspapers considered have a combined daily circulation of 16 million and coverage is likely to mirror issues raised through other forms of national media.

Many different factors influence the decision to present for cervical screening.\textsuperscript{34,35} During the period of our study, the British government began a campaign to promote a new HPV immunization programme for schoolgirls. This may have increased media interest, Internet searches and cervical screening coverage. In addition, it may have accentuated the impact of Jade Goody’s diagnosis as the story became of greater public interest. However, it is unlikely to account for the association between Internet searches and key events in Jade Goody’s illness.

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**References**


14 Eysenbach G. Infodemiology and infoveillance: framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the Internet. *J Med Internet Res* 2009;**11**(1)e11.


