Reviewer’s report

Title: Newspaper coverage before and after the HPV vaccination crisis began in Japan: A text mining analysis

Version: 0 Date: 27 Aug 2018

Reviewer: Megan Smith

Reviewer's report:

This is an interesting article examining newspaper coverage in Japan before and after the HPV vaccination crisis, examining some of the content themes, and going beyond whether an article's content was 'positive' or 'negative' towards the HPV vaccine. The situation in Japan in relation to HPV vaccination represents a wasted opportunity to prevent a highly preventable cancer - something that is incredibly sad and will cost women's lives. It is important to examine the extent to which the media played a role in this loss of confidence in the HPV vaccine in Japan. This could assist Japan in preventing similar issues arising in future, and would also assist other countries who seek to ensure their vaccination programs are resilient.

I have a number of comments about the article that are primarily around improving clarity or context.

1. The Results section and Discussion section should be restructured, as almost no results are actually reported in the Results section, but are reported for the first time in the Discussion. For example p8 lines 3-23 should all go into the Results section. Similarly lines 31-46 on the same page and on p9 lines 6-10 and the paragraph that starts on line 54. This is not intended to be an exhaustive list of everything that should be moved - this whole discussion section should be reviewed.

2. In a couple of places statements are made about attitudes to vaccination (p4 lines 28-33; p8 lines 51-54) - are there any references specific to Japan to indicate the same is true in Japan? It doesn't necessarily need to be in relation to the HPV vaccine specifically, but is there a precedent in Japan for this sort of thing happening for other vaccines? If not, clarify that information is limited for Japan, but data from other settings suggest this is the case.

3. More broadly, it would be helpful to understand if the issues around the HPV vaccine (adverse event reports and/or hesitancy) are unique to the HPV vaccine or if there is any previous experience with this in Japan, because it would give some context. For example, has this sort of thing occurred with other foreign-manufactured vaccines but not locally-manufactured; has it happened with childhood vaccines or only adolescent ones; do adverse events always attract this level of media attention and withdrawal of recommendation by the Ministry of Health, Labour and Welfare, or was this situation unusual? P8 lines 23-28 mention that the negative articles have decreased and the public may therefore in future forget about the HPV vaccine 'scandal': is there evidence from previous experience in Japan with vaccine hesitancy that this could be expected?
4. A limitation of this analysis is that it does not take into account the role of social media and particular lobby groups, which appear to have played an important role in propagating negative messages and the loss of confidence in the HPV vaccine in Japan (and elsewhere)(1). This should be noted as a limitation.

5. P5 lines 13-23: When you collected articles, did this include articles in both the online editions of the newspapers or only the paper version (or are these identical for these newspapers? This is not always the case).

6. P5 line 34: keywords are listed. Does this mean the articles had to be tagged with these as keywords, or was the full text of the article searched? Also, if the text is searched as kanji/ Japanese characters, could the specific characters searched for be included?

7. P5 line 44: when you say the first author thoroughly read textual data, how much do you mean that they read? I assume not all of the articles?

8. P6 line 59: when you say "the first author repeated these analytical procedures twice" - do you mean writing the code rules, or using the code rules to analyse the text (but why would the second of these change, and if it doesn't, what is gained by repeating this)?

9. P10 lines 1-21: are you able to look at whether or not there are joint mentions of adverse events and safety/ expert advice in the same article? For example in many settings it would be normal that if the media reported on an adverse event, they would also ask an expert to respond and they would often present the wider evidence on the safety of the vaccine, so there was some balance or official response. Given the number of articles is very different, clearly not every story about adverse events includes reassurance via WHO statements etc - but does that mean the adverse events articles tend to be one-sided and the ones mentioning safety statements also include some negative comments about adverse events - or do articles tend to just present one view in each case (either positive or negative)?

10. P11 lines 25-48 discuss cognitive dissonance as possibly explaining the bias in media coverage. I understand this point, but in that case wouldn't there have been dissonance/disharmony when something they had previously presented in a positive light (HPV vaccine) became associated with something negative (adverse events)? The dissonance does not seem to apply equally in both directions, so I don't think this fully explains the situation ie the media probably have some predisposition to report on 'scandal' as it might be seen as a more 'interesting' story?

MINOR COMMENTS
11. The timeline provided in Appendix 3 is really useful, and as I read the Introduction I was thinking that sort of thing would be good - but it is not referred to until the Discussion. I suggest you refer to it much earlier, in the Introduction so that people know they can go there for more detail on the sequence of events.
12. P3 line 41: when you say women in their 20s and 30s have been most affected by the increases in mortality - is this also true of incidence as well as mortality?

13. P4 lines 21-26: you mention perceived credibility of media - could you provide more information about how this is measured?

14. P5 line 36: Could you clarify why the start date of January 2005 was selected for the search?

15. P7 line 38: the results refer to articles from July 2009 but the search period is specified as starting from January 2005. I assume this meant no articles were found prior to July 2009, but if so then it would be better to say this clearly, eg articles from July 2009 (the date of the earliest article found) to September 2017; or say - no articles were identified between January 2005 and June 2009.

16. P9 lines 18-23 mention Japanese mothers - are there studies to support that in Japan mothers are the main decision-makers in relation to HPV vaccination for their daughters (or vaccines more generally), or do fathers or the daughters themselves play some role in the decision?

17. The authors provide some suggestions for reducing in bias in newspaper coverage in Japan, mainly around public health professionals engaging more with the media, or directly with the community, for example through blogs. While these are potentially helpful, I suspect they oversimplify what is required in Japan to some extent. For example professional societies have spoken out in favour of the HPV vaccine (1), but as shown in the current study, this has attracted relatively little in the way of media attention. Dr Riko Muranaka wrote a number of media articles explaining the safety of the HPV vaccine and critical of the data presented by the anti-vaccine groups, and was subjected to substantial recriminations. A key issue appears to be that the Ministry of Health, Labour and Welfare (MHLW) still has not re-instated the proactive recommendation for the HPV vaccine, even though their safety investigations (and international data) found no evidence of a causal link between the HPV vaccine and the reported adverse events. This issue of a lack of strong clear support from government organisations for the HPV vaccine seems equally worthy of discussion, and it fits with the authors' description of how the city of Nagoya reacted to pressure from anti-vaccine activists. Again - is there evidence from any prior experiences in Japan (with other vaccines or with any health-related concern) that would give insight into whether or not strong support from the MHLW could allay community fears in the context of adverse media?

REFERENCES

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.
Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
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Yes

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Not relevant to this manuscript

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