Content and accuracy of vaccine information on pediatrician blogs ☆

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ABSTRACT

Background: Parents often use social media such as blogs to inform decisions about vaccinations, however little is known about pediatrician blogs addressing vaccines. The objective of this study was to assess content, citations, audience engagement and accuracy of vaccine information on pediatrician blogs.
Study design: We conducted a content analysis of vaccine information on pediatrician blogs. A national sample of pediatrician blogs was identified using a search rubric of terms applied to multiple search engines. Inclusion criteria were: (1) the writer identified as a pediatrician (2) US based (3) ≥1 post since 1/1/2014. We identified 84 blogs; 56 fit inclusion criteria. Data were collected on all posts mentioning vaccines from 1/1/14 to 2/28/15. We identified the major topic for each post, examined citations to determine sources of information and counted the number of comments per post to evaluate audience engagement. We assessed accuracy of vaccine information using evaluation criteria adapted from information for parents on the CDC website.
Results: We identified 324 unique blog posts containing information about vaccines on 31 pediatrician blogs. The most common major topic was vaccine-specific posts (36%); Influenza and MMR were the most prevalent. Other common topics included: activism against anti-vaccine information (21%), vaccine exemptions (10%), autism (8%), and vaccine safety (6%). Activism against anti-vaccine information was the topic with the most reader engagement. The most common sources cited were governmental organizations such as the CDC and WHO (34%), and medical journals (31%). All blogs except 2 included information that was consistent with CDC information.
Conclusions: Pediatrician bloggers frequently address vaccinations; most provide accurate information. Pediatrician blogs may be a new source to provide vaccine education to parents via social media.

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1. Introduction

In today's digital world, many parents seek information about vaccines online and on social media [1–5]. Social media is an online communication forum where parents can read and respond to information in real time [6]. Previous studies have identified inconsistent quality of health information and the presence of misinformation online, especially regarding vaccination [6–10]. Additionally, there is a robust presence of anti-vaccine information on social media which can influence a parent's decision not to vaccinate [9,11–14].

Many studies have emphasized the impact that healthcare provider communication can have on vaccine-hesitant parents [15–17]. How healthcare providers interact with parents on social media regarding vaccination is largely unknown. Parents and physicians have an interest in exploring social media's role in healthcare communication though there is little evidence to support the best practices [18–20]. Web logs, or blogs, are the longest established social media platform. Blogs are websites that contain narrative entries, "blog posts", typically in reverse chronologic order, and are maintained by one or more writer or "blogger" [21]. Blogs can provide detailed information on health-related topics, including vaccines [6,21]. Pediatricians are in a unique position to use social media, like blogs, as tools to convey vaccine information to parents who fall into high online use age categories [18,20,22]. The American Academy of Pediatrics (AAP) has recognized the importance of communication via social media and has developed a toolkit for pediatricians to talk about vaccination on

social media [23]. Blogs may be a forum for pediatricians to promote vaccination online [22].

Before pediatricians can recommend blogs to patients, it is necessary to understand whether pediatrician blogs address vaccines and what topics are covered. Further, it is critical to establish whether blogs provide accurate vaccine information. The primary aim of this study was to evaluate the content and accuracy of vaccine information on pediatrician blogs. The secondary outcomes were to explore the sources of information referenced within blog posts and how often readers engaged with the bloggers on blog posts about vaccination.

2. Methods

2.1. Study design

We conducted a content analysis of publicly available blogs to understand how pediatricians address vaccination on blogs. Our primary study aims were to identify what topics about vaccinations were addressed on pediatrician blogs and whether the vaccine information on pediatrician blogs was consistent with vaccine information from the Centers for Disease Control and Prevention (CDC). We defined a pediatrician blog as a blog written by one or more pediatricians, and a blog post as a single post within a blog. Only publicly available data were used. This study was determined to be exempt from human subjects review by the Seattle Children's Hospital Institutional Review Board.

2.2. Search strategy

We identified a national sample of pediatrician blogs using a search rubric of terms applied to multiple search engines. Search terms included: doctor blog, child health blog, pediatrician blog, kid health blog, teen health blog, pediatric blog. Additionally, we identified blogs using snowball sampling; we included pediatrician blogs that were identified by references in another person's blog or from websites containing lists of child health blogs. We used the top three search engines in terms of size of market share: Google, Bing and Yahoo [24]. Two investigators (MB, HG) independently searched to identify pediatrician blogs. By using publically available search engines and snowball sampling, we sought to replicate how a parent may identify a pediatrician blog.

2.3. Blog inclusion criteria

Blogs were included if the writer identified as a pediatrician or doctor, had greater than 50% of the last 10 posts related to pediatric health topics, and had at least 1 post since 1/1/2014. We restricted this study to US-based blogs because the CDC vaccine schedule and information is US-specific. We collected information from the blog site about the number of bloggers per blog, degrees held, and the type of doctor. We did not conduct any outside searches to verify blogger credentials. Duplicate blogs were eliminated from the sample.

2.4. Measures

Content: Two investigators (MB, HG) categorized blog posts into major topic categories using an inductive approach. The investigators reviewed each blog post independently to determine (1) if vaccination was discussed, and (2) the major topic of the post. Open coding was used to generate a list of data-driven code topics contained in the blog posts [25–27]. The investigators independently analyzed blog posts in blocks of ten to code for major topic. After each block was analyzed, investigators discussed differences in coding to reach consensus on the major topic. Six rounds of coding were used to reach topic saturation [21]. After topic saturation was reached, the investigators independently analyzed the remaining blog posts. Interrater agreement was calculated as the percent agreement between the two investigators after independent review for each major topic. Any discrepancies between the investigators coding for major topic was reviewed by both investigators to reach a consensus major topic for each blog post.

Accuracy: We defined accuracy as vaccine information consistent with information for parents on the CDC website. We developed ten CDC-consistent concepts (CDCC) adapted from the CDC's "Infant Immunization FAQs" that we used as criteria to determine accuracy of vaccine information [28]. Examples of CDCC included: "Children should be vaccinated along the CDC recommended schedule," and "Vaccines do not cause autism." (Table 2). Each blog post was evaluated for all CDCC and rated as 1 if it contained accurate information, 0 if it did not address a given criterion, and −1 if it addressed the criterion, but included information that was inconsistent with CDC information.

Sources of Information: Citations were defined as text descriptions of information sources or hyperlinks to other sources of information. Bloggers could provide citations of outside information sources, or the blogger's own source, which we referred to as "self-citation." We classified "self-citation" as a reference to another work by the same author i.e. a published article or another blog. Types of citation were inductively classified by two investigators. Types of citation were categorized into (1) media/social media sources (e.g. blogs, newspaper articles), (2) scholarly sources (e.g. journal articles, government websites such as the CDC), and (3) other. A single blog post could contain multiple citations of the same type which were considered one source (i.e. multiple journal articles) or could contain multiple different types of citation sources (i.e. a journal article and another blog post).

Audience Engagement: We counted the number of comments posted per blog post to determine how often readers were engaging with the blogger. Number of comments was assessed at the level of blog post, blog and by major topic.

2.5. Data collection procedures

Data was collected on each blog post mentioning vaccines from 1/1/14 to 2/28/15. Of note, this period of time encompassed two outbreaks of vaccine-preventable diseases, Pertussis in June 2014 and Measles in December 2014 [29,30]. All blog posts were evaluated for vaccine content even if vaccination was not the post title. Two investigators separately evaluated each blog post. Interrater agreement was calculated for each category and ranged between 63 and 100%, mean of 89%.

2.6. Analysis

Descriptive statistics were calculated for all measures. For audience engagement, we conducted a Kruskal-Wallis test to evaluate if there were differences in the number of comments by major topic. There was one prominent outlier blog with a large number of blog posts. We conducted a sensitivity analysis excluding this blog to assess the relationship of comments by major topic in the remaining blogs.

3. Results

The initial search identified 84 pediatrician blogs. Of those, 27 (32%) had no content posted after 1/1/2014, 1 was not US-based, 25 (30%) did not contain vaccine information; 31 (37%) met inclusion criteria (Fig. 1). In these 31 blogs, we identified 324 unique