

YouTube as lactation consultant: A content analysis of breastfeeding videos on YouTube



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Abstract

Breastfeeding mothers often encounter difficulties continuing this behaviour without adequate professional and social support. Using a natural language search strategy, we identified a sample of 100 popular breastfeeding-related videos on YouTube, an increasingly popular platform for disseminating health-related information. Content analysis was used to evaluate popularity, tone & purpose, informational quality, accessibility, character representation, and production value. Videos had a mean of 341,953 (standard deviation 852,340) views. Most videos referenced external information sources (84%) (e.g. health care providers or clinicians), emphasized instruction and facts (95%) and conveyed an encouraging/promoting tone (86%). The most popular topics addressed were position, latch, and nutrition. Behavior modelling (69%) or the use of props/products (41%) were common. Most videos appeared to have white primary speakers (76%), with fewer black (4%), Hispanic/Latina (4%), or Asian/Asian-American (1%) speakers. Popularity of YouTube breastfeeding content suggests that free, immediate video resources provide support for breastfeeding continuation via explicit instruction and detailed information. Content may fill gaps, including access to information after hours and within the privacy and convenience of home, ability to repeatedly hear advice and see it modelled, and engagement with an online community. YouTube will likely gain importance as a resource to empower mothers and normalize sustained breastfeeding.

Introduction

Background

Breastfeeding confers immediate and long-term health benefits on infants and mothers. However, rates of exclusive breastfeeding at six months, a practice recommended by the American Academy of Pediatrics, are estimated to be as low as 25% in the United States, and potentially even lower in under-resourced populations [1, 2]. Drivers of these trends vary across individual mother-child dyads, communities, and populations, yet the relationship between limited social and informational breastfeeding support resources, and decreased breastfeeding continuation rates comprises a common theme in research [3, 4].

Appropriate emotional, tangible, and educational support from social networks (e.g. partner, family, friends), including professionals (e.g. health care providers, lactation consultants) can increase breastfeeding initiation or duration [5]. However, socioeconomic factors, such as limited health insurance coverage, medical mistrust, and stigma associated with breastfeeding, may limit certain

populations' access to helpful support from professionals [1, 6, 7]. Demographic transition and migratory patterns have also diminished the role of kin and the accessibility of extended family's support in childrearing [8]. Further, negative attitudes toward breastfeeding and inadequate breastfeeding advice from network members or sub-optimal maternity care at health facilities can modify the quality of support and contribute to early breastfeeding discontinuation [4, 9, 10].

In response to these social changes, information-seeking patterns among US parents, including breastfeeding mothers, show increased demand for and use of online resources for health information and community-building around health needs [11, 12, 13]. Interest in understanding the quality and quantity of content available through participatory social media sites, including YouTube and Facebook, has grown as these platforms have become increasingly influential [14, 15].

Research on widely available digital breastfeeding resources highlights a need for additional investigation of many of these platforms [16]. Since free, detailed, user-

generated videos could deliver highly accessible and actionable breastfeeding informational and emotional support to wide audiences, we chose to focus on content hosted on YouTube. We use a modified Theory of Planned Behavior to guide our content analysis of YouTube breastfeeding videos.

Theoretical Framework

For decades, the Theory of Planned Behavior (TPB) has served as a framework for understanding a broad range of health behaviors [17]. According to TPB, individuals' health decisions are driven by their perception of societal norms (subjective norms), assessment of how much influence they have in the situation (perceived control), desire to take action (intention), and beliefs about an action's effects (attitude). This framework has guided much prior research on breastfeeding-related behaviors including breastfeeding continuation [18].

However, public health practitioners have critiqued TPB's focus on individual-level factors in the breastfeeding context and beyond. The behavioral choices available to breastfeeding mothers may vary by context, and individuals cannot always modify factors that operate at the community or structural levels [18, 19]. In response to this limitation, we developed a modified framework (**Figure 1**) informed by the Socioecological model, which contextualizes an individual and her health behaviors within nested levels of influence [20]. In our new framework, the desired behavioral outcome of breast-

feeding continuation is shaped by factors operating on three overlapping contexts. The individual, community, and structural levels parallel Brofenbrenner's macro-, meso-, and microsystems [20]. Norms, which parallel TPB's subjective norms construct, may affect the informational and social support resources available to breastfeeding mothers and operate at the structural level. Simultaneously, community-level resources (e.g. local availability of breastfeeding professionals) can inform community-level intent similarly to TBP's intention construct, but instead act as collective motivation to encourage breastfeeding. Our framework acknowledges individual mothers' potentially constrained efficacy in breastfeeding continuation through the consideration of these intent and ability constructs at the individual level as well.

The present study uses this hybrid theoretical framework to guide an initial contextualization of YouTube videos as a resource to inform individual and community-level intent and ability to engage in breastfeeding continuation. By considering YouTube videos as a potential community-level resource, we assume a baseline level of supportive norms among viewers who seek out these videos. Video viewing may reinforce these norms by increasing the visibility of these videos for future resource seekers since higher view counts make videos more likely to appear in future searches.

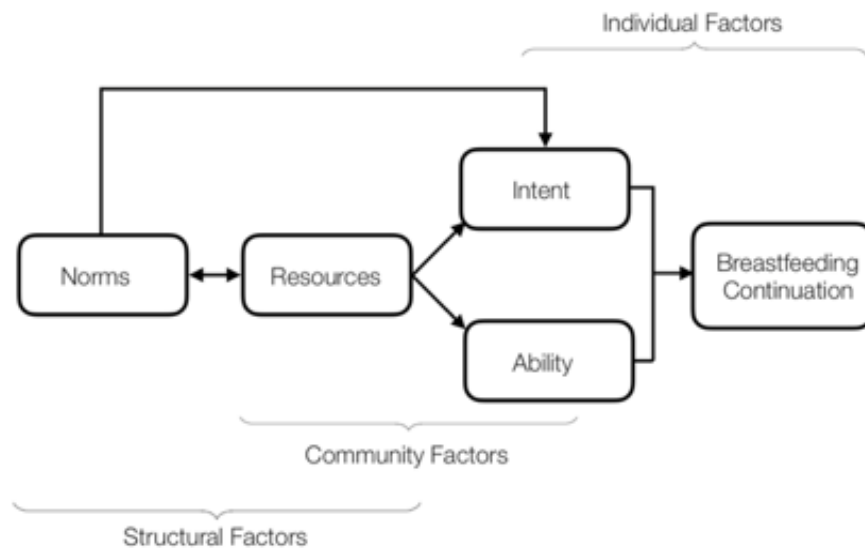


Figure 1: Hybrid conceptual model.

Research Question

Our content analysis explores three dimensions of YouTube videos about breastfeeding. First, it broadly categorizes the types of videos available to breastfeeding mothers seeking support by purpose and tone. Next, it describes the informational quality and accessibility of these videos. Finally, it investigates possible relationships between video characteristics (e.g. production quality, commercial sponsorship) and view count.

Our video categorization, quality assessment and accessibility assessment improves understanding of how health practitioners might use existing resources to promote breastfeeding. Further, this study highlights resource gaps that providers and content creators could address. Promoting healthy practices through appropriate engagement with and supplementation of existing content in the breastfeeding support video landscape could have a measurable positive impact on rates of US breastfeeding continuation.

Methods

Sample selection

To gather a sample of videos that likely reflect those most frequently watched by individuals seeking breastfeeding support, we used question-based search terms rather than more traditional keywords. Online search behavior has increasingly relied upon “natural language” queries in question format as search algorithms have evolved to match consumer behaviors [21]. We formulated search terms using questions that appeared three or more times on the Frequently Asked Questions section of five reputable English language websites for breastfeeding information [22, 23, 24, 25, 26]. The 19 selected questions reflect search terms used by breastfeeding mothers rather than other audiences.

We used a Google search of videos to reflect common search strategies likely employed by breastfeeding mothers. Google search dominates the search engine market; an estimated 72-92% of the global search engine market share between October and November 2017 [27, 28, 29]. Our model posits that breastfeeding mothers seek informational responses to questions, which is a task better suited to the general search mechanism of classic Google searches than to YouTube’s built-in search which uses an algorithm focused on generating entertaining videos [30]. To collect the most frequently-watched and

relevant YouTube videos, we fed these questions into Google’s video search engine in an anonymized browser. All sample videos and associated data were collected between November 18 and November 29, 2017.

Coding Instrument

We created a novel coding instrument to assess video content and characteristics. Individual videos were considered both a recording and context unit. All videos were viewed in their entirety. We employed a two-stage process to test for reliability and to refine the coding instrument. Two raters used consensus coding for the 10 videos with highest view count to assess reliability. The initial joint probability of agreement was 58.9%. Reviewers subsequently discussed and selected alternatives suggested by the literature to modify the coding instrument [31, 32].

Each rater then coded 55 videos, 10 of which were randomly selected and viewed by both raters. Consistent with Krippendorff’s content analysis methodology [31], interrater agreement of the final coding instrument was assessed by proportion of matching responses, yielding an acceptable 83.0% agreement. Most differences reflected one-point discrepancies in scaled response components; no discrepancy exceeded two-points.

Data Collection & Analysis

The coding instrument gathered information across six domains:

1. **Video Characteristics.** View count, channel subscriber count, and number of viewer comments at the time of coding were noted. Video producer type (e.g. vlogger, health care provider, individual breastfeeding mother) and country of production were noted as was whether the video stood alone or comprised a series of breastfeeding videos. Other production characteristics were recorded as binary variables (i.e., yes =1, no =0) and included presence of video editing, apparent sponsorship, product placement, and whether the video had an amateur or “self-made” appearance.
2. **Purpose & Tone.** We recorded the following as binary variables: producers’ apparent intent to share a video with an instructional, testimonial, advertising, referral to professional resources and/or other purpose. We also eval-

uated video tone (i.e. a) encouraging or promoting, b) informative, and c) cathartic/venting) as binary outcomes.

3. Information. The quality of information was evaluated by the citation of sources, such as health provider, personal experience, or other health sources. Coders noted presence or absence of referrals to health professionals or other additional sources of breastfeeding-related information. Each of these variables was coded binarily.

4. Accessibility. We assessed informational accessibility within the video via complexity of language (three-point scale where vernacular = 3 and complex jargon = 1), and the following binary variables: use of captions or text, behavior modeling, photo illustration, and the use of props.

5. Representation. We noted additional descriptive variables such as primary character identity (e.g. breastfeeding mother, clinician, narrator, other), apparent age and race/ethnicity of primary and secondary characters, coding each as binarily. Apparent socioeconomic status (SES) depicted in the video based on the observable characteristics (e.g. clothing, furniture) using a 3-point Likert-type scale (high = 3, to low = 1). For example, a plainly dressed breastfeeding mother in a minimally furnished concrete clinical setting would be rated low apparent SES, while another wearing elaborate jewelry sitting in a kitchen with expensive-looking appliances would receive a high SES rating. In cases where background or character cues were insufficient to evaluate SES the raters coded “unknown” for the SES value.

6. Production Value. We combined several technical quality variables into a Production Index to evaluate videos’ overall estimated production value capturing eight components: overall video quality (high = 3, to low = 1), scripting, entertainment value (highly entertaining = 5, to very boring = 1), and binary variables of: video editing, background music, apparent sponsorship, product placement, and whether the video had an amateur or “self-made” appearance.

All descriptive analyses were performed using Excel (Microsoft, 2017), with remaining analyses conducted using Stata 14.0 (Statacorp, College Station, TX).

Results

Sample Description

Searches using our 19 selected question terms yielded millions of results. We reviewed the top 50 videos of each search (n=950) and excluded videos not hosted on YouTube (e.g. hosted and embedded on news organizations’ websites and unavailable on YouTube), videos not in English, and videos with low counts (below 5,000). Of the 950 videos reviewed, 206 unique videos met inclusion criteria. The final sample included the 100 videos from this group with the highest view counts.

Table 1 (Appendix I) displays descriptive characteristics of our sample. The average video in our sample had been posted on YouTube for 3 years and 10 months (SD1 year, 10 months) and was 4 minutes and 18 seconds long (SD4 min, 53 sec). **Table 2 (Appendix II)** displays results of our content analysis by domain: purpose and tone, information, accessibility, production, and representation.

Content Features

Popularity & Production

The mean overall view count was 341,953 (SD852,340). Videos received an average of 10,027 monthly views (SD25,135). There was a mean of 37 comments per video (SD73). The average channel hosting videos had 946,574 subscribers (SD2,050,000). Most videos appeared to have been produced in the United States (86%) by professional vloggers or social media networks (62%), health care providers or clinicians (41%). Commercial product marketers and non-commercial, individual breastfeeding mothers produced fewer of the videos (22% and 18%, respectively). Only six videos were the sole breastfeeding-related video posted by their channel; all others were part of a series (94%). Individual channel hosts produced a majority of the videos (52%).

Purpose & Tone

Video intent was assessed as predominantly instructional (93%) with content providing actionable advice. A smaller proportion of videos were classified as testimonial (27%), where the video featured personal experiences. Videos with a product-promoting intent (e.g., commercially available galactagogues, breastmilk storage products, and internet marketing services) were the least common (14%).

Coders rated most videos as having an informative tone (95%), emphasizing instruction, methods and facts. Most videos were also rated as conveying an encouraging or promoting tone (84%) characterized by cheerful demeanor and affirming language. Few videos expressed a cathartic or “venting” tone (3%) where speakers articulated current challenges or solicited help from viewers.

Information

The majority of videos addressed multiple breastfeeding-related topics (n=81). Most frequently discussed topics included breastfeeding position (46%), latch (40%), and nutrition or diet (29%), followed by pain/discomfort (27%), and pumping (25%). Less frequently discussed topics included establishing milk supply (15%), other postpartum maternal health issues (11%), and formula (7%).

Most videos referenced an information source (84%) with creators most often citing professionals, such as lactation consultants or clinicians (56%) followed by personal experience (37%). Videos cited other sources less frequently, such as websites or research (17%). Sixteen videos contained no reference to information sources while 42% of videos referred viewers to specific health information sources (n=42). Compared to recommending that viewers consult with a lactation consultant (15%) or physician (13%), more videos recommended that viewers consult other health information resources such as websites, blogs or additional videos (30%).

Accessibility

Most videos used moderately accessible language; 56% used language that was neither jargon-heavy nor completely conversational. A smaller proportion of videos used only simple vocabulary and a vernacular style of speech (40%) and few used complex vocabulary (3%). Heuristic devices frequently accompanied speech, such as modeling recommended behavior (69%), using props or breastfeeding products (41%), or displaying photos illustrating behaviors (26%). Optional text captions accompanied 85% of videos.

Representation

An off-screen narrator was the primary speaker in 45% of videos. Breastfeeding mothers and clinicians took a primary speaking role in 39% and 37% of videos respectively. Most videos appeared to have white primary speakers (76%); 4% of primary speakers appeared to be of Black/African, 4% appeared to be Hispanic/Latin-American and 1% appeared Asian/Asian-American. Among 21% of videos, ethnic/racial appearance was not noted as ambiguous or not visually depicted. Most videos in our sample were classified as mid-level SES (65%) while 17% and 4% depicted high- or low-SES, respectively.

Video Production

The mean video production score was 11.83 out of 20 possible points (SD 3.13) (**Figure 2**).

Discussion

Most videos were informational in nature, with a tone suggesting promotion of breastfeeding. If view counts reflect viewer demand, then viewers seem to prefer instructional videos with detailed information related to specific issues or topics. YouTube’s on-demand, user-generated model allows viewers to witness physical demonstrations of techniques in multiple settings, potentially enriching social learning [33, 34]. The popularity of videos with informational and encouraging/promoting tones suggests that videos may fill gaps in or expand community support for breastfeeding. This parallels findings that breastfeeding continuation decisions may be more influenced by “encouraging, approving, or offering advice rather than by providing general [less tangible] support for mothers and children” [10].

Video characteristics suggest informational and social support resource gaps for breastfeeding continuation. Videos can provide detailed informational support instantaneously such that users can find help at any hour in any setting with internet access. Viewers have the ability to repeatedly hear advice and see demonstrations. These videos may also supplement social support resources, including dialogue with others beyond their immediate environment, through comment functions or creation of additional response videos.

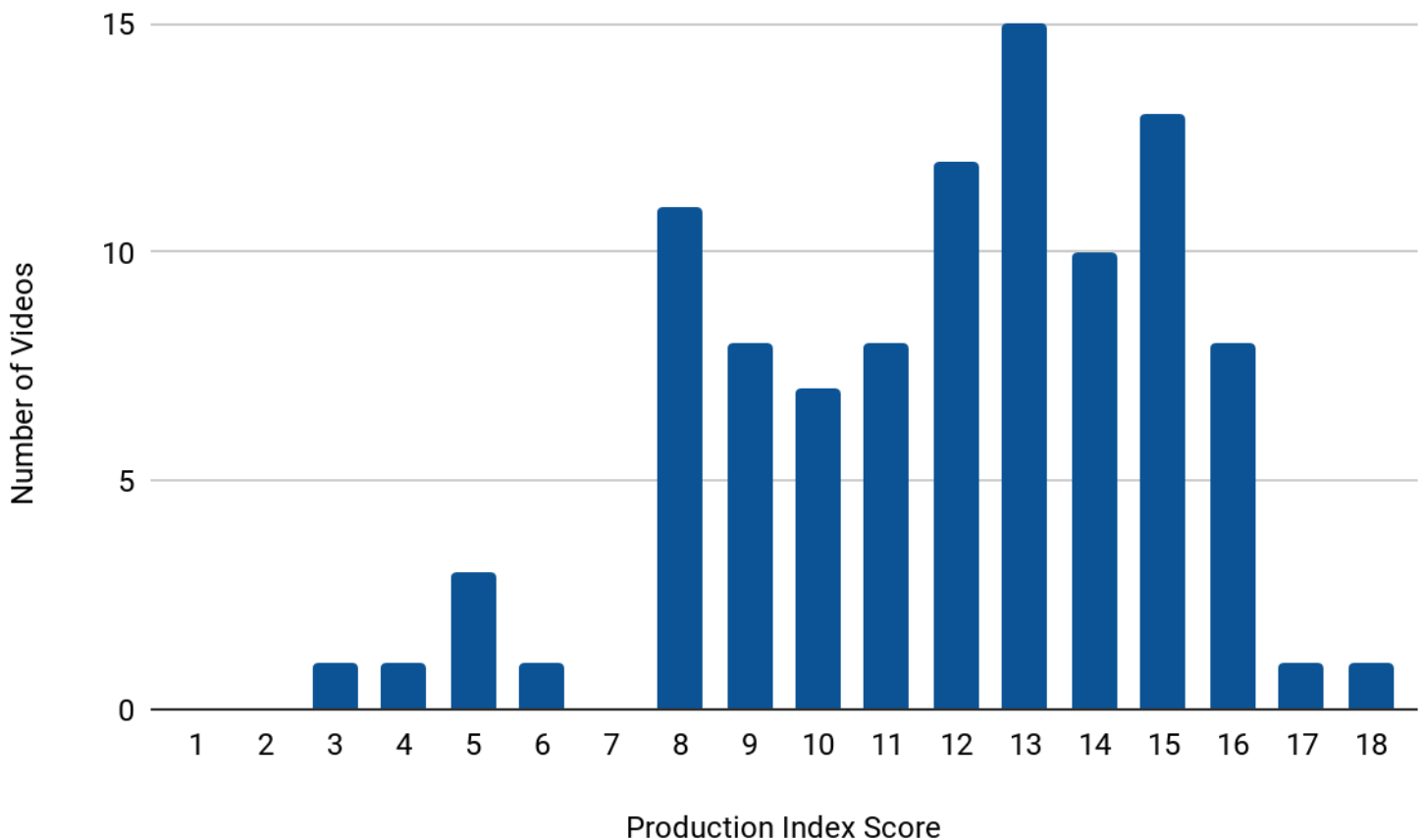


Figure 2: *Production index score vs. number of videos (count, n=100).*

Viewer affinity with those represented in videos may stem from parasocial interaction, promoting trust between producers and their audience [34, 35]. If the characters in this sample reflect target audiences, then these videos may appeal most to white, middle-class, women between 30-40 years of age [36]. This demographic does not necessarily correspond to women who have low rates of breastfeeding, nor does it relate to the populations with the lowest access to lactation consultants [37]. However, this pattern likely reflects positive intent for breastfeeding continuation among this demographic, which results from positive social norms and access to resources, such as the materials, time, and skills, necessary to create these videos. This pattern corresponds to our conceptual model, which suggests that access to material resources, along with structural- and community-level norms that support breastfeeding, contribute to continuation of breastfeeding. These norms likely inspire producers' willingness to create and share helpful videos, which in turn can become

an informational and emotional support resource for others.

The rectangular distribution of production scores and relationship between production index and view counts (**Figure 2**) suggests that production value was not predictive for popularity. A more linear association with increased production index value and increased view count could have reflected viewer preference for videos that appear more legitimate or professional. However, the absence of this trend and a lack of videos with low production quality may instead reflect how content creators may employ search engine optimization (SEO) methods (i.e. use of hashtags, metadata, and frequent updates) to increase view counts and visitor traffic to their channels [38].

Contribution to the literature

Generally, prior content analyses of breastfeeding in traditional (e.g. print, film, television) and social media emphasize breastfeeding-focused content's shaming or normalizing potential [36, 39, 40, 41, 42, 43]. Other analyses have linked depictions of breastfeeding on television and film and other types of messaging (e.g. advertising, celebrity social media) to societal attitudes toward breastfeeding mothers or breastfeeding, in general [36, 40].

We found three studies on breastfeeding information-seeking that investigated the use of YouTube videos. Foss [36] explored YouTube videos in the larger context of social media, which may be used to send messages of encouragement or disapproval of breastfeeding to mothers who seek support. Another YouTube video content analysis completed four years prior, assessed the informational content, target audience, and general tone of the most popular YouTube videos involving breastfeeding and found a wide range of informational quality and breastfeeding subtopics represented, along with many advertisements related to infant formula, which they had not anticipated finding [44]. One summary of a conference presentation found that YouTube hosted relatively few videos of high instructional quality, and public comments that ranged from supportive to shaming [45].

Limitations

While our method of using natural-language question queries in acquiring our sample potentially strengthened our approach by mimicking search patterns, this process assumes that the questions listed as "frequently asked" on popular and reputable websites matches the questions real women might have. In other words, we presume that women who would use YouTube as a resource would have enough background knowledge to formulate such questions. Women without previous exposure to breastfeeding may not have sufficient understanding of the mechanics or terminology to ask technical questions. As a result, our video sample may preclude populations of breastfeeding who skew younger and/or have fewer baseline resources such as education or income.

While the 100 popular videos that we analyzed may reflect a high proportion of total views of breastfeeding videos on YouTube, our relatively small sample size

represents another limitation of this study. The small subset of videos coded by both raters limited our ability to measure interrater reliability, such as calculating a Cohen's kappa coefficient. As such, our estimate of interrater reliability reflects quantity of disagreement and does not account for chance agreement.

Further, our sample is cross-sectional, inhibiting our ability to detect causal relationships or account for changes over time. Additionally, we observed trends that differed dramatically from those found in a previous YouTube content analysis on the same subject just a few years prior to ours, highlighting the tempestuous nature of social media use patterns and rapid evolution of search algorithms [36]. As with any user-driven content, content creators have partial control over media's availability through privatization or deletion options. YouTube can remove videos violating their Community Guidelines, which frequently evolve with societal and legal expectations [46].

Conclusions

In 2015, 90% of the U.S. population had at least one internet-enabled device available for use in their homes, and over 30% had three or more devices, suggesting that YouTube is only a click away for most U.S. mothers [47, 48]. Our most viewed video had an average of 2.2 million views per year, which is striking when considered in light of the 3.9 million live births in the U.S. in 2015 [49]. Given the accessibility of YouTube and the increasing reliance on social media as a source of health information, a large portion of new mothers may access these YouTube videos. Google analytics of YouTube viewer data found that over 50% of users are female and that users are more likely to have at least one child when compared to non-users [50]. Our study's insight into one type of existing resource could provide useful insight for breastfeeding promotion.

Given the highly informative and accessible nature of most of the included videos, YouTube content addressing common breastfeeding questions may already fulfill reported needs for informational and social support for some populations who have a degree of breastfeeding-supportive norms and resources [43, 51]. Our content analysis found that YouTube videos do not necessarily depict women (e.g. low income and/or uninsured, women of color and indigenous women) who may benefit most from this accessible format. Our theoretical framework

suggests that this type of change would depend on shifting social norms in these communities. Proponents of breastfeeding may consider producing and curating content according to social representation, varied levels of perceived breastfeeding social norms, and existing knowledge. The democratic nature of social media-based interventions could be harnessed to benefit underserved women by providing culturally-specific and accessible messaging, which could reduce missed opportunities for breastfeeding continuation in a socially supportive and cost-effective way [12, 51].

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Appendix I

Table 1: Descriptive statistics of YouTube breastfeeding video sample (n=100).

Popularity Indicators	n	Mean (SD)	Minimum	Median	Maximum
Total Views	100	343,898 (852,340)	32,104	104,862	6,880,000
Months since posting	100	46 (22)	4	47	108
Views per month	100	10,027 (25,135)	0	2,404	185,910
Comments	99*	37 (73)	0	15	538
Comments per month	99*	1 (4)	0	0	38
Length (seconds)	100	258 (293)	28	187	2,008
Subscribers	95**	946,574 (2,050,000)	24	57,943	5,920,000

Production Indicators	
Video Producer Type	
Vlogger/Social Media Network	62/100
Health Care Provider/Clinician	41/100
Commercial Product Marketer	22/100
Individual breastfeeding mother	18/100
Other	2/100
Part of a video series	
Single video	6/100
One in a series of videos	94/100
Country of video production	
US	86/100
Other	7/100
Unknown	7/100
Video Editing: presence of effects, voiceover, multiple scenes	
Yes	80/100
No	20/100
Products mentioned by brand name	
Yes	16/100
No	84/100
Sponsorship	
Sponsored	41/100
Not sponsored	59/100
Self-made	
Yes, host/narrator is the video producer	52/100
No	43/100
Unknown	5/100

Appendix II

Table 2: Video indicators by dimension: Tone and purpose, information, accessibility, and representation.

Tone & Purpose Indicators	n	%
<i>Purpose of video</i>		
Instructional	93/100	93
Referral	6/100	6
Soliciting	1/100	1
Testimonial	27/100	27
Product promotion	14/100	14
<i>Tone</i>		
Encouraging/Promoting	84/100	84
Informative	95/100	95
Cathartic/Venting	3/100	3
<hr/>		
Informational Indicators	n	%
<i>Topic discussed</i>		
Breastfeeding position	46/100	46
Latching	40/100	40
Nutrition or diet	29/100	29
Breastfeeding pain or discomfort	27/100	27
Pumping	25/100	25
Establishing milk supply	15/100	15
Other postpartum maternal health issues	11/100	11
Formula	7/100	7
Parenting advice (other than breastfeeding)	5/100	5
Breastfeeding in public	3/100	3
Mastitis	2/100	2
Other breastfeeding issues	47/100	47
<i>Source of information (can have more than one)</i>		
Health care provider or clinician	56/100	56
Personal breastfeeding experience	37/100	37
Other health sources	17/100	17
No information source mentioned	16/100	16
<i>Referral to additional information</i>		
Lactation consultant	15/100	15
Physician	13/100	13
Other	30/100	30
No referral	58/100	58
<hr/>		
Accessibility Indicators	n	%
<i>Language used</i>		
Very complicated	3/100	3
Not complicated, not overly conversational	56/100	56
Very simple	40/100	40
<i>Captions or Text</i>		
Yes, option for CC present	85/100	85

No text or CC	13/100	13
<i>Behavior modeled</i>		
Yes, behavior is modeled	69/100	69
No	31/100	31
<i>Photos or images</i>		
Yes, photos are used to illustrate recommendations	26/100	26
No	74/100	74
<i>Demonstration using props</i>		
Yes, props or breastfeeding products are shown	41/100	41
No	59/100	59
<hr/>		
Representation Indicators	n	%
<i>Primary speaker (can select multiple identities)</i>		
Narrator (voice only, no identity)	45/100	45
Breastfeeding mother	39/100	39
Clinician	37/100	37
Other	4/100	4
<i>Apparent socioeconomic status</i>		
Low (unfurnished home setting)	4/100	4
Mid	65/100	65
High (professionally styled, costly furnishings)	17/100	17
Not applicable	14/100	14
<i>Race/ethnicity of host/narrator (can select more than one)</i>		
Caucasian	76/100	76
Black	4/100	4
Asian-American/Pacific Islander	4/100	4
Hispanic/Latino	1/100	1
Unknown	21/100	21
<i>Secondary characters depicted</i>		
Yes	34/100	34
No	66/100	66
<i>Race/ethnicity of secondary character(s), if depicted (can select more than one)</i>		
Caucasian	27/100	27
Black	12/100	12
Asian-American/Pacific Islander	3/100	3
Hispanic/Latino	5/100	5
Unknown	1/100	1