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## HOW SOCIAL MEDIA CAN CONTRIBUTE TO HEALTH PROMOTION IN THE CONTEXT OF A BREASTFEEDING CAMPAIGN IN GHANA

Crystal Karen Montejo

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HOW SOCIAL MEDIA CAN CONTRIBUTE TO HEALTH PROMOTION  
IN THE CONTEXT OF A BREASTFEEDING CAMPAIGN IN GHANA

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A Thesis  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Public Health

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by  
Crystal K. Montejo  
May 2021

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Crystal K. Montejo

May 2021

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## ABSTRACT

**Background:** Globally, people are active on social networking sites (SNS).

Utilizing social networking sites for public health purposes is a potential avenue to provide health promotion campaigns to large audiences. Even so, little evidence is available that provides the extent of this possibility and more importantly, the practices needed to create a successful health promotion campaign on social networking sites.

**Objective:** The purpose of this study was to determine if engagement on Facebook differed by type of engagement during a post acquisition period and to understand which post type (i.e., quote posts, resource posts, video posts, and blog posts) material received higher engagement in a breastfeeding social media marketing campaign in Ghana.

**Methods:** Four post type material were distributed during the campaign (i.e., quote posts, resource posts, video posts, and blog posts). Data representing key performance indicators (i.e., exposure and engagement) were extracted from Facebook after the two week post acquisition period, which was a period of garnering users to the campaign's Facebook page. Additionally, data were from Facebook 1 week after the material was posted on the Breastfeed4Ghana Campaign's Facebook Page. A Wilcoxon-Signed Ranks Test was performed to determine the peak performance during the post-acquisition of each amplification and applause on Facebook. A one-way ANOVA test was conducted followed by Bonferroni's post hoc test to determine differences between the posts type.

**Results:** The 23 Facebook posts during the two-week post acquisition period received a median (IQR) applause (i.e., number of likes) of 47(19, 509) and amplification of 6 (4, 14). It took a median of 5 (3, 9) days to reach peak applause and 2 (1, 4) days to reach peak amplification. The median engagement score between applause and amplification was significantly statistic. Campaign materials received an average (SD) exposure of 1111 (860) on Facebook. Applause was the most prevalent form of engagement (mean (SD) “likes”: 30.98 (23.18)), followed by amplification (“shares”: 8.16 (6.00)). Engagement scores for quote and resource posts was statistically significantly greater than engagement scores for blog and video post ( $p < 0.05$ ).

**Conclusions:** The study findings conclude that days to peak performance on Facebook was higher for applause, rather than amplification. Across the four post type materials distributed during the campaign, quote and resource posts received greater levels of engagement in comparison to video and blog posts after one week.

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## CHAPTER ONE

### INTRODUCTION

Worldwide, approximately 42% of infants under 6 months of age are exclusively breastfed, despite the unparalleled benefits of breastfeeding (UNICEF 2020). Breast milk promotes sensory and cognitive development and protects infants against infectious and chronic diseases (WHO 2019). One of the most important times to breastfeed is during the first six months of life, during which the WHO recommends infants are exclusively breastfed. Exclusive breastfeeding (EBF) requires that an infant only consumes breast milk and no other liquid or food (Victora et al 2016). EBF during the first six months of life reduces infant mortality due to common childhood illnesses such as diarrhea or pneumonia and promotes quicker recovery from illness (WHO 2020). Breast milk contains all the essential nutrients in the appropriate quantities that an infant under 6 months old needs. Furthermore, breastfeeding provides health benefits for the mother, such as preventing breast cancer (Victora et al 2016). Despite the known benefits of breastfeeding to both the child and mother, the rates of EBF remain low.

The low rates of exclusive breastfeeding are the result of many complex contributing factors. The mother-infant relationship can impact a mother's breastfeeding experience and confidence to continue breastfeeding (Rollins et al 2016). There are three levels of the drivers which affect the environment in which a woman breastfeeds: structural, settings, and individual determinants (Rollins et

al 2016). Structural determinants include social trends, trendy products, legislation, and social practices which impact a society (Rollins et al 2016). An example of this would be the large variety of infant formulas that are commonly available in stores; formula marketing strategies are designed to encourage a woman to formula feed rather than give breast milk. Settings determinants refer to an environment that influences breastfeeding through the health care systems, workplace and/or community (Rollins et al 2016). This involves the access to privacy and space at work to pump breast milk for her child. Determinants at the individual level are linked to the bond, understanding, and/or connection between a mother and child that may encourage breastfeeding (Rollins et al 2016). An instance of this would be a mother wanting to breastfeed but being discouraged to do so due to fussiness by the child or perceived insufficient milk supply. These three levels can partly explain the current breastfeeding rates; the lack of or slowing down in improvement in optimal breastfeeding is in large part due to marketing practices that promotes formula use, social aspects such as being shamed for breastfeeding in public, culture, education, politics, attitudes, practices, a woman's age, weight, and overall wellbeing (Rollins et al 2016). All of these factors contribute to a mother's decision to breastfeed.

In Ghana, EBF rates were up to 63% in 2012 but by 2015 had fallen to 52% among infants under 6 months of age (Ghana Statistical Service - GSS, Ghana Health Service - GHS, and ICF International 2015). To better understand the recent decline in EBF rates and understand how to improve the enabling

environment for breastfeeding in Ghana, a committee of stakeholders engaged in the *Becoming Breastfeeding Friendly Initiative* designed to inform decision makers on ways to improve breastfeeding outcomes at a national level (Pérez-Escamilla et al 2018). This resulted in evidence-informed recommendations to improve the environment to better promote, protect and support breastfeeding (Aryeetey 2018). Key recommendations included: a). prioritizing the advocacy and promotion of breastfeeding, b). creating stronger breastfeeding policies, and c). escalating the delivery services of breastfeeding. It was proposed that a social media campaign could be a resourceful way to meet these recommendations.

Social media is a prominent tool that people utilize daily in a variety of ways. Worldwide, there are currently 3.8 billion people actively on social media, with Facebook being the most widely used social media platform (Chaffey 2020). While social media utilization varies across the world, the growth of social media use has been substantial in low- and middle-income countries in recent years (Poushter et al., 2018). For instance, between 2015 and 2017, the percent of adults in Ghana who used social networking sites increased by 12 percentage points (from 20% to 32%, respectively) (Poushter et al., 2018).

A mixture of industries has taken note of the reach social media has and have harnessed it to their advantage. Health care providers are utilizing social media as a way to connect with the public, network, engage with other professionals in their field, and conduct research (Househ 2013). Public health professionals use a social media site such as Twitter to provide information to the

public, to lower budget costs, and to observe health crisis in real time (Hart et al 2017). The general public uses social media as a way to obtain health information, therefore health agencies must continue to tap into this modern form of health promotion and find effective ways to provide easily accessible and accurate information to the public through social media (Jha, Lin, and Savoia 2016). One other way to utilize social media is for health campaigns, where social marketing and health promotion can occur and lead to successful health outcomes.

#### Problem Statement

There remains a need for decoding effective health promotion practices through social media. Incorporating health promotion into social media to protect, promote and support breastfeeding could improve exclusive breastfeeding rates, which will ultimately improve maternal and child health. Understanding which marketing measures can promote breastfeeding activities among women is fundamental for such improvement (Rollins et al 2016). Mass media has been used effectively in breastfeeding promotion campaigns. The Brazilian National Breastfeeding Program created a mass media campaign that supported and encouraged breastfeeding, with one form of promotion being through TV, radio, lottery tickets, bills, and bank statements. This contributed to an increase of breastfeeding duration from 2 months in 1975 to 10 months in 2000, with continuous growth being seen (Perez-Escamilla 2012). The Women, Infant, Children (WIC) program in the United States established the Loving Support

Makes Breastfeeding Work campaign that sought out the barriers to breastfeeding that women face in the work field. Although the campaign was promoted in different ways by the WIC program, the overall message of supporting and promoting breastfeeding remains active throughout the program as a factor towards improving breastfeeding behavior (Perez-Escamilla 2012). Mass media campaigns allow for long term impacts and flexibility in how health information is presented. It is common for a public health campaign to incorporate social media for advertisement, campaign creation, and encouraging conversation over the campaign topic (Abrams 2019). As media and marketing evolve from traditional forms such as TV and print news to the internet and social media, social marketing campaigns must follow suite. If a social marketing campaign can be conducted through social media, then the reach may be higher considering the number of individuals who use social media, and the levels of engagement people can have with the content. Collecting this type of data typically come from insights, which involves data mining to determine the levels of engagement on SNS from users (Neiger 2012). Measuring the levels on engagement ranges from low (acknowledging and liking a post) to medium (sharing a post) to high (becoming a partner, volunteer, or consumer because of the post) (Neiger et al 2012). Being able to collect data from SNS and measuring engagement levels are fundamental towards analyzing the potential impact on a user.

## Significance to Public Health

Social media opens the door to an assortment of communities and could be a way to provide access to programs and services (Neiger et al 2012). From a public health perspective, utilizing social media allows for access to health information and intervention at a low-cost (Laranjo et al 2015). This is beneficial to public health campaigns because it may offer the opportunity to create a campaign with higher reach at a relatively lower cost. Social media may be a way to promote breastfeeding and provide support, especially in regions that are limited in their health resources and where many women turn to social media for peer support on matters related to breastfeeding and childrearing (Bridges, Howell, and Schmied 2018). Knowing which health promotion and social media tools and techniques yield successful health results would be advantageous to optimizing the use of social media for breastfeeding promotion, support, and the logistics of data collection. Ghana is an ideal context to examine the use of social media for disseminating information regarding breastfeeding protecting, promotion, and support due to the country's strong commitment to breastfeeding and given the rapidly rising utilization of social media among young adults.

## Purpose of Study

This study aims to understand which types of materials distributed through Facebook as part of a campaign to promote, protect, and support breastfeeding in Ghana are more effective at garnering engagement. Additionally, the study aims to examine days to peak performance on Facebook between applause and

amplification during the post acquisition period. This study utilizes data from the Breastfeed4Ghana campaign. Breastfeed4Ghana was a six-month long Twitter and Facebook-based campaign program with the intent of utilizing social media to promote, protect and support breastfeeding in Ghana, and examine different dissemination approaches for delivering the campaign material through social media (Harding et al 2020). One dissemination pathway was promoting the campaign and breastfeeding through paid advertisements, which targeted those 18 to 49 years of age. This pathway resulted in a statistically significant increase of exposure (124%) on Facebook compared with the baseline dissemination approach of simply posting the campaign material on the campaign Facebook page (Harding et al 2019). A post acquisition period was implemented to increase awareness to the campaign and build a following. Facebook pages with similar content were “liked” and “followed” in order to draw a larger audience. Facebook posts were at a rate of 1-2 a day, 7-14 per week, published at specific times and days of the week.

Such a study in the context of a health campaign can be very beneficial in gaining knowledge about the reach of social and best practices for high campaign material (i.e., post) performance. The Breastfeed4Ghana campaign was very effective in creating different types of material to post in their dissemination paths. This included but was not limited to video posts, quote videos, resource posts, and blog posts. In addition to understanding how different types of dissemination pathways impact post performance, it is vital to

understand how different types of social media posts perform to allow best practices for developing health promotion content for dissemination via social media.

## Research Questions

### Aim 1

- To determine if post acquisition of engagement on Facebook differ by type of engagement in the context of a breastfeeding social media campaign.

H1a. The median number of days that it takes for a Facebook post to acquire peak applause (number of likes) will be different than the median number of days that it takes to acquire peak amplification (number of shares) by at least 1 day.

### Aim 2

- To determine whether the engagement performance differs across types of posts (i.e., video, quote, resource, or blog) in the context of a breastfeeding campaign on Facebook.

H1b. The mean engagement score for the video posts on Facebook will be twice as high compared with the three types of non-video posts (i.e., quotes, resources, or blogs).

*Post performance will be defined as the number of comments per post, the number of shares per post, and the number of likes per post at a rate per 100 followers on the respective platform at the time of material posting.*

To understand the relationship between social media, health promotion, and breastfeeding practices, secondary data which included the engagement metrics of Facebook posts within the context of a breastfeeding campaign will be analyzed. The campaign was a total of six months, separated into a two -week acquisition period to develop a campaign following, followed by 5.5 months of the core campaign period during which campaign messages were disseminated via social media. The campaign posts focused on promoting, protecting, and supporting breastfeeding practices in Ghana. Material post performance outcome will be evaluated by number of likes, shares, and comments per post on Facebook. Data were extracted weekly from Facebook Insights<sup>1</sup> and entered into a Microsoft Access database. An engagement score (equation 1) was calculated representing the mean of the applause and amplification rates of a post.

The principle engagement metrics that I focused on was applause and amplification. Applause was defined as the number of likes on each Facebook post and amplification is defined as the number of shares on Facebook. A rate per 100 followers on the respective platform at the time of the material posting will be employed. Applause and amplification rates per 100 followers on the campaign's Facebook page were calculated to account for possible confounding of engagement from the size of the campaign fan base.

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<sup>1</sup> Facebook Insights is a free analytics tool to understand how users interact with a profile through likes, comments, shares as well as providing user demographic information.

The findings from these two research questions were imperative to providing data on how to best attribute to the success of a breastfeeding social media campaign. It is beneficial for a future campaign to know which social media post types attract the most engagement and impact to the public to allow for a larger reach in improving breastfeeding rates. Additionally, recognizing the amount of days to peak performance on Facebook could be of use for future health promotion campaigns. This would create the opportunity to focus more time and effort on post and platforms that have a higher chance of gaining engagement.

## CHAPTER TWO

### LITERATURE REVIEW

The development of social media has and continues to impact the world. Social networking sites (SNS) can be defined as a “web-based communication channel for the public to interact, share, and collaborate on” (Lombard et al 2018). SNS are free of financial cost to join, and include Facebook, Twitter, YouTube, and Instagram. Each SNS has an aspect in their system that differentiates them from each other. The post type that are seen on Facebook and Twitter are typically text-based posts that can include images, videos, or graphical interchange format (GIFs) while the posts on Instagram typically involve either an image or a video that may potentially have text included (Arigo et al 2018). Social media includes how present and active someone is on social media, how able one can relate to others on the platform, how open or private someone presents themselves on social media, the community a user includes themselves into, and the number of times a user is sharing content and conversing with others on the platforms (Kietzman et al 2011). Functions of SNS can be classified in seven categories that are: presence, relationships, reputation, groups, conversations, sharing, and identity (Kietzman et al 2011). These functions offer the user the opportunity to create an online identity, build relationships, and groups with those they feel share common interest, recognize the social standing and presence of different users as well as converse with other users and share content (Kietzman et al 2011). These functions allow information

to be received in a multitude of ways, especially considering that the duration of a video and character count on a post is typically limited and varies for each platform (Arigo et al 2018). Globally, there are 3.8 billion people active on at least one social media platform. Approximately 69% of active social media users have a Facebook account, making Facebook the most widely used social media platform worldwide (Chaffey 2020).

Social media users represent a geographically and demographically diverse population. In the United States, a person with a higher income and education status is more active on SNS suggesting that those with higher incomes have more free time to use social media for work related purpose, and people who have academic educational experience feel they can obtain more information through social media (Hruska and Maresova 2020). Age is also a factor associated with the use of SNS in the United states and is inversely correlated to the likelihood of having a social media account (Hruska and Maresova 2020). However, different SNS attract different age groups. For example, Twitter and YouTube typically attract those 30 years or older, while 50% of Instagram users are 18-38 years of age (Hruska and Maresova 2020). For those who are 50 years and older, their social networking site of preference is Facebook (Perrin and Monica 2019). The dissimilarities in age demographics across the platforms may be explained, in part, by the different functions of these various social media platforms. Due to the appeal of connecting, learning, and

speaking with others on social media, users continue to sign up and remain active on SNS.

The use of social media has grown continuously high since it first began. The first SNS were launched around the 1990s, with a previous popular social networking site called Lunastar reaching a high of 600,000 users in 2001 (Edosomwan et al 2011). By 2017, there were 2.86 billion people worldwide using SNS, with predictions to reach 4.41 billion in 2025 (Clement 2020). The majority of places around the world have seen a rise in the use of SNS. Only 20% of users were recorded in Ghana in 2013, increasing to 32% by 2017 (Silver and Johnson 2018). In 2013-14, 34% of 19 emerging economies reported using SNS, which increased to 53% by 2017-18 (Poushter et al 2018). Individuals utilize SNS for different reasons, ranging from access to news, entertainment, communication with friends and family, advertisement, and review of products (Kapoor 2017). For example, the Pew Research Center reported that 85% of adult internet users in Sub-Saharan Africa use the internet for social and entertainment purposes (Silver and Johnson 2018). SNS allow for communication with others across the globe, which is beneficial, especially if they seek an affordable and convenient form of communication. This can have a positive impact on people, with 45% of people in sub-Saharan Africa stating that the role of SNS on their lives has been positive (Silver and Johnson 2018). Some positives that SNS bring is the ability to talk to family members who live far away, and to stay connected to the surrounding world. With such an astronomical

amount of people around the world using SNS, these platforms provide an opportunity to reach a large audience for matters related to health.

The highly accessible large user base of social media presents the opportunity to utilize social media for health promotion purposes. SNS has been involved in health promotion in the past. Reasons are that SNS provides health promotion that it is cost efficient, with communication on it being highly effective and allowing the ability to reach a specific target audience (Hruska and Maresova 2020). The majority of people on SNS follow people they know or people that share a common interest. (Hruska and Maresova 2020). SNS offers a resource of support and encouragement from others, such as a breastfeeding mother's seeking affirmation or information from users in their same community (Marcon, Bieber and Azad 2018) This personability can result in a greater sense of trustworthiness towards what is seen on the sites, while organizations that do not have social networks are less credible to people who are on social media (Hruska and Maresova 2020). Many health organizations have recognized the power of SNS and have created a Facebook page for the simple aim to inform the public about health-related matters (Neiger et al 2012). SNS are a point of access to information for the public. Even so, the success of releasing information on SNS is often dependent on certain metrics presented below.

For health promotion in particular, the presentation and success in sharing health information can be measured in a few ways. Key Performance Indicators (KPIs) provide measurements for the performance of social media content (e.g.,

posts or pages), and include metrics of exposure, reach or engagement (Neiger et al 2012). KPIs of engagement with a post could include liking, sharing, or even commenting on a post (Arigo et al 2018). Unfortunately, engagement can at times be infrequent, which makes it challenging to interpret the performance data and ensure that a certain marketing tactic is working. Despite irregular engagement by social media users across time, indicators of an individual's engagement with campaign material presented on SNS often correlates with improved health outcomes (Arigo et al 2018). A meta-analysis study of 21 studies of utilizing SNS for health behavior change found that such an effort could be successful and impactful if there is high use engagement and a large reach (Yang et al 2017). Thus, engagement is an important metric for behavior change interventions. In order for behavior change to happen through social media, the content should be educational, supportive, have a specific target population and a presence of similarity to other users they follow (Arigo et al 2018). Furthermore, social media users generally engage more with their preferred platforms of choice and topics of their specific interests; while people's engagement with social media is spread across many different platforms, engagement concentrates on topics of interest (Arigo et al 2018). Consequently, health promotion must be distributed on multiple SNS to receive appropriate engagement from the target population, especially since market researchers are convinced that feedback from social media is a more accurate form of research than a traditional survey (Hruska and Maresova 2020). This is understandable

because some people have multiple SNS while others may have just one. Knowing how to properly design a social media-based health promotion campaign is the first step in ensuring a potentially successful outcome. Allocating the necessary time, proper strategies, effort, and creativity to a social media-based health promotion campaign are necessary for campaign success (Hruska and Maresova 2020). Fortunately, prior health promotion campaigns executed through SNS have managed to find a good balance at creating a health promotion campaign which resulted in positive outcomes.

The evolution of SNS in terms of their functions, reach, and influence on daily life is noteworthy and will certainly continue. As these platforms evolve, so will the marketing capacities and capabilities for public health, among other sectors. Social media has been used as a tool for health promotion with a variety of applications. Campaigns based on SNS are able to be of a short or long duration and focus a specific message at a low cost per head to the target population, which has shown success through past social media campaigns (Wakefield et al 2010). An example of a successful social media-base social marketing effort is a campaign that was run through a university's Facebook page that aimed to educate college men about the Human Papillomavirus (HPV) Vaccine. The campaign engaged students through videos, which on average had over 17,000 views and resulted in improved knowledge among college men about HPV (Hughes et al 2019). A campaign of this matter was successful because it had a target audience, and presented information through video,

which is often visually appealing to help better understand a message. Tactics that include finding the most effective form of communication for your target audience make a significant impact on the outcome of a campaign.

Smoking cessation has been a long, strenuous public health battle over the past sixty years with many social marketing campaign efforts launched against smoking. The National Truth Campaign was disseminated through select TV networks in 2000 and successfully targeted 12-17 years old with a smoking cessation message for youth (Farrelly et al 2009). This campaign was successful due to the campaign strategically presenting smoking cessation messages on networks that their target audience was sure to be watching. With the high volume of individuals on SNS, it is important to analyze past campaigns that have seen success in health promotion through social media. When it comes to weight loss, a mobile app was utilized as a weight loss intervention and concluded that users who were more engaged on the app (i.e., reporting weight, dietary intake, and physical activity) were more likely to lose weight (He et al 2017), highlighting the importance of engagement, and perhaps community, in social media-based interventions. Another example is a skin cancer prevention campaign conducted via Twitter in Northern Ireland, which proved to be effective in altering attitudes towards UV exposure in 10-12% of the target population (Gough et al 2017). Many other campaigns have been conducted through social media campaigns, which support the use of SNS as an effective tool for health promotion. Health promotion campaigns generally target large audiences and

aim to present a message that address the barriers to health behavior change and helps people embrace healthy ways of living by oftentimes invoking cognitive and emotional responses (Wakefield et al 2010). SNS can be utilized for public health campaigns because they are able to create a tailored message, provide information to the public in real time, and extend education to those active on the SNS (Gough et al 2017).

Optimizing campaigns through social media requires effort, dedication, and understanding. Designing a campaign that has clear goals, intentional marketing tools, and efficient execution on the goals is fundamental. Target audience engagement is crucial. Therefore, any social media-based campaign must conduct formative research to understand their target audience, including their preferred SNS. It is equally important for the campaign organizers to understand how to create a post that best suits that social networking site's platform (Hruska and Maresova 2020). For example, if a campaign's target population is bringing a type of health awareness to adolescents, then disseminating a post on a social media platform would be better than a blog post. Social media platforms are generally very user-friendly, make it easy to connect with others, and have a well-designed mobile phone interface. Compared to the wordy blog post model of communication, the shorter or image-centric content found on platforms such as Facebook and Instagram are better suited for mobile phones (Neiger et al 2012). Knowing if a social media campaign was successful is, at times, complicated to decipher because it relies so heavily on likes, reposts,

and comments (Gough et al 2018). Specifically, not all those who have a social networking site engage with the content they are seeing (i.e., liking, sharing, or commenting). If someone is not engaging in the content (e.g., a post), it becomes difficult to analyze the reach that content had on the population. In past Public Health campaigns for health promotion, content dissemination pathways have included posts, videos, blog posts, photos, and quote photos. In many cases, these various campaign materials present the benefits of either engaging or not in a particular health behavior which in turn means it is important to know which types of content are more impactful to allow for effective health promotion (Gallagher and Updegraff 2012). Knowing the type of content to post is particularly relevant because the way risks are framed often times reflects how well someone understands low vs high health risks, a concept that has been demonstrated in past media campaigns (Gallagher and Updegraff 2012).

Public Health promotion requires knowing the proper marketing techniques to enforce an idea. A media campaign done through Facebook that focused on educating college men on the HPV Vaccine produced various types of campaign materials and dissemination pathways. Presented in this campaign through Facebook was campaign posters, notification of a post to followers, and three online videos (Hughes et al 2019). Although the campaign materials and notification gathered some attention, it was the videos that were the most impactful for influencing the students and engaging them in conversation about the HPV vaccine (Hughes et al 2019). The campaign consisted of three videos,

with one being informative with a nurse, the second being more light-hearted with the student body president, and the third being with an alumnus that contracted cancer due to HPV, which accumulated 17,000 views and 197 shares between all three videos (Hughes et al 2019). In this study, when it came to college males talking about a topic such as HPV, disseminating a video through SNS had a great influence on health promotion.

Another demonstration of a successful health promotion effort was the National Truth Campaign to prevent youth smoking, which excelled in their marketing practices to achieve success. The campaign launched commercials based around smoking from 2000 to 2002 on television networks that had a high volume of young watchers such as FOX, UPN, and WB and eventually over to MTV (Farrelly et al 2009). This media campaign knew their target audience of adolescents between 12 and 17 years of age, and released smoking cessation information on a popular television network, a platform that the target audience was likely to be engaged in. The commercials played continuously, with exposure to the commercial increasing more and more over time. Through the campaign, 450,000 people aged 12-17 did not initiate the act of smoking which indicates a successful campaign (Farrelly et al, Hussin 2009). The National Truth Campaigns (NTC) is encouraging and suggests that with intentional social marketing and market segmentation can be successful in its attempts to prevent poor health outcomes.

One more example of a health promotion campaign is the In One Voice intervention campaign aimed towards young adults on the topic of mental health awareness from January 2012-March 2012. The campaign focused on a Public Service Announcement presented on Facebook and Twitter by a popular hockey player who spoke of mental health issues and promoted a youth focused educational website called mindcheck.ca (Livingston et al 2014). This campaign achieved partial success in that the campaign was able to increase awareness of mental health issues and the mindcheck.ca website but was not able to completely improve attitudes and stigma surrounding mental health issues (Livingston et al 2014). Although not all goals of the campaign were met, there is evidence from a post campaign exposure survey that a small amount of those exposed to the campaign did experience improved attitudes related to matters of mental health (Livingston et al 2014). Although this campaign lacked total success, its data enforces that mass media interventions can reduce stigma and improve attitudes as well as the fact that even after the campaign was completed, the material was still available through SNS to access.

One theory associated with SNS is social network theory. Social network theory is the idea that people are involved in a network that contributes to behavioral influence (Moukarzel et al 2020). One study analyzed Twitter data to better understand the presence and influence of breastfeeding on the social networking site (Moukarzel et al 2020). Of the 3,798 users, half of the key influencers came from a profession background in breastfeeding research,

practice or advocacy (Moukarzel et al 2020). Knowing the key influencers for a health promotion campaign through a social networking site would be strategic because these users have the most impactful influence towards engaging the public (Moukarzel et al 2020). Studies such as this one are important for better understanding the necessary tools needed for a health promotion campaign to be successfully executed through social media.

Using SNS as a form of health promotion is still a fairly new concept. It has been tried and shown to have successful outcomes when done correctly. Social media has data to support its effectiveness and benefits for a campaign through SNS that can only be offered online (Maher et al 2016). To be considered are social interactions, user familiarity, privacy, platform cost and usability, and engagement when utilizing SNS for a health promotion campaign (Maher et al 2016). It is important to be specific in any campaign and involve a target audience, dissemination platform and a needs assessment in order to see the best results. Social media is incredibly powerful, in part, due to its ability to reach so many people who are active on the various platforms. If health professionals are able to effectively utilize it to their advantage, there is potential to have significant impacts on public health through social media. SNS has the capability to enhance the frequency or depth of many health issues that may be occurring in an individual's social network, which has the power to either provide further exposure to a certain campaign or reinforce a particular health behavior, which can eventually influence public policy (Wakefield et al 2010). Social

networking site/s are advantageous, accessible, and powerful. It would be in the best interest of an organization and the public to utilize the different SNS to create change and better health for all.

## CHAPTER THREE

### METHODS

#### Study Design

Breastfeed4Ghana, a social media marketing campaign, was created in response to the recommended actions of the Becoming Breastfeeding Friendly (BBF) Initiative in Ghana. The BBF recommended advocacy, protection during maternity, and providing effective education regarding breastfeeding (Aryeetey et al 2020). Breastfeed4Ghana was the first breastfeeding social media campaign in Ghana with the aim of promoting, protecting, and supporting breastfeeding to enhance the health of babies and mothers.

The Breastfeed4Ghana campaign itself was executed over a six-month period on Facebook and linked to the campaign website. It began with a two-week acquisition period that aimed to develop a follower base prior to the launch of the campaign. A high volume of Facebook posts promoting the campaign and breastfeeding were shared during this period. Following the acquisition period, the campaign was launched and actively ran for 5.5 months. The campaign was designed around three themes, each theme consisting of four key messages (12 total), with each message supported by five core materials that were posted on Facebook. The development of these campaign materials has been published previously (Aryeetey et al 2020). The campaign website provided general information about the campaign and hosted weekly blogs that aligned with the

campaign messages and were designed to provide practical information or support.

On a weekly basis during the campaign, 5 core campaign materials were posted on both Facebook along with a variety of supporting posts. For instance, there were weekly quote posts to highlight breastfeeding advocates in Ghana. Additionally, there were weekly post to promote breastfeeding-relevant resources curated by the campaign and blog post written by the campaign team, all of which were housed on the campaign webpage. Finally, there were weekly video posts that summarized the campaign content from that week.

#### Data Source and Collection

An important part of health promotion through social media is to consider Key Performance Indicators (KPIs) which can be being categorized into insights, exposure, reach, and engagement (Neiger 2012). Engagement, the central KPI in the current study, is connecting the measure between social media and user activity (Nieger et al 2012). Nieger et al. distinguished different “levels” of engagement, such as low, medium, and high. Low engagement includes an acknowledgement of a post (e.g., “liking” a post), while medium engagement requires increased interaction with the post, such as “sharing” a post, and high engagement involves an even greater commitment to the content in the form of “commenting” on a post. Engagement can also be expressed in the form of “page likes” or “page followers”. Page engagement was a KPI to measure the success of the acquisition period and to provide perspective on post engagement.

For the Breastfeed4Ghana campaign, data were collected from Facebook Insights throughout the campaign and entered into a Microsoft Access database. Data from campaign posts during the acquisition period were collected on a daily basis after materials were posted for up to 23 days. During the campaign period (i.e., after the acquisition period), post data were extracted 1 day, 1 week, and 2 weeks after the post date. The post data included the number of comments, shares, and likes per post. During both the acquisition and campaign periods Facebook page data were extracted on a weekly basis and consisted of the number of followers and page likes. Data were imported into Stata for cleaning and SPSS software for analysis.

### Data Analysis

Only Facebook data were used to address these aims.

#### Aim 1

To address aim 1, postdate from the post acquisition period was utilized. To standardize post performance, specific to applause and amplification, peak performance of each metric (applause and amplification) for each post was calculated, and the number of days it took for each post to achieve its peak applause and peak amplification was determined. A Wilcoxon-Signed Ranks Test was utilized to determine the difference in peak performance on Facebook for post-acquisition of each amplification and applause on Facebook.

## Aim 2

To address aim 2, post data from the campaign period were utilized. Posts were included in this analysis if they were a blog promotion posts, quote posts, resource posts, or video posts. An engagement score was calculated for each post based on the data extracted 1 week after the post date. The engagement score represents the average of amplification rate per 100 followers (i.e., number of post shares per 100 followers) and applause rate per 100 followers (i.e., number of post likes per 100 followers). To test the hypothesis that the mean engagement score would be higher for video posts compared with non video posts (i.e., quotes, resources, or blogs), a one-way analysis of variance (ANOVA) test was run.

Table 1. Explanation of Post Type

Post Type	Explanation of post type
Videos Posts	Provided a review of the campaign’s weekly material in a short video format.
Blog Promotion Posts	Dedicated to promoting the campaign’s weekly blog post that was housed on the campaign website. These blogs were on topics related to infant and young child feeding, with emphasis on breastfeeding.
Quote Posts	Quote Posts are text-based posts quoting well-known and respected figures in Ghana who have advocated for or promoted breastfeed.
Resource Posts	Posts highlighted a breastfeeding-related resources that was identified by the campaign team. A comprehensive list of the curated resources was housed on the Campaign’s webpage.

Equation 1: Engagement score = [(Facebook applause rate + Facebook amplification rate)] /2

### Ethics

IRB approval for this project is not needed because there are no human subjects.

## CHAPTER FOUR

### RESULTS

#### Aim 1. Engagement on Facebook During Post Acquisition

Table 2. Number of Days Until Posts Reach Peak Engagement (n=23)

	Median	IQR	Min	Max	Mean	SD
Applause	5	3, 9	2	19	6.65	4.23
Amplification	2	1, 4	1	18	3.74	4.01

The number of days to peak post performance across engagement metrics (i.e., applause and accumulation) were examined among 23 Facebook posts during the two-week acquisition period. These posts' received a median (IQR) applause (i.e., number of like) of 47(19, 509) and amplification of 6 (4, 14). It took a median of 5 (3, 9) days to reach peak applause and 2 (1, 4) to reach peak amplification (Table 2).

When engagement was examined for peak performance on Facebook during the post acquisition period using a Wilcoxon Signed-Ranks test, a statistically significant difference across median engagement scores between applause and amplification was identified ( $Z = -3.657$ ,  $P = < 0.001$  two tailed test) (Figure 1).

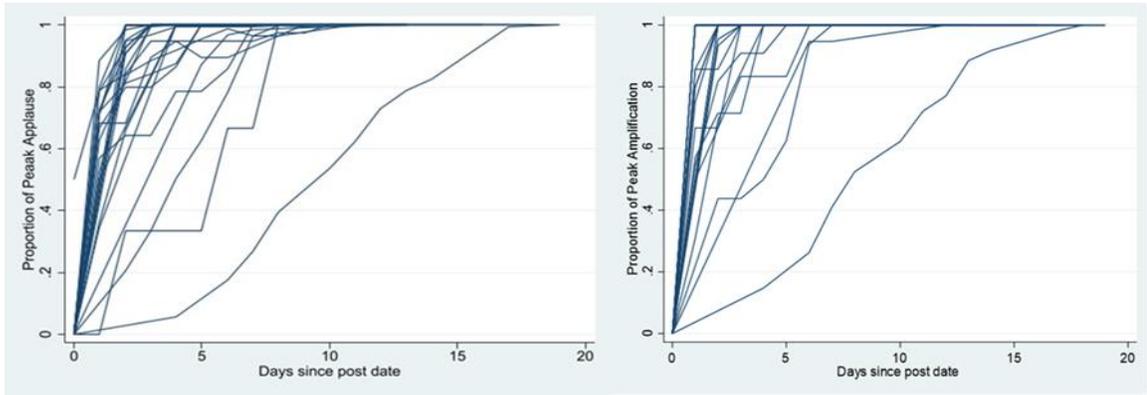


Figure 1. Growth Curve Number of Days Until Posts Reach Peak Engagement (n=23)

Aim 2. Performance of Facebook Posts by Post Type

Table 3. Mean (SD) Post characteristics as Key Performance Indicators (n=55)

	Crude Values	Rate per 100 Followers
<i>Key performance indicators</i>		
Exposure	1111 (860)	29.06 (21.64)
Engagement		
Applause	30.98 (23.18)	0.82 (0.59)
Amplification	8.16 (6.00)	0.21 (0.15)
Conversation	0.91 (2.00)	0.024 (0.051)

Post data for 55 of the campaign's Facebook posts were included in the analysis examining post performance across four different post types. Posts' received engagement in the form of applause [mean (SD) "likes": 30.98 (23.18)], amplification ["shares": 8.16 (6.00)], and of conversation ["conversation": 0.91 (2.00)] (Table 4).

When engagement was examined across post types using a one-way ANOVA, a statistically significant difference across mean engagement scores between the four post type (i.e., video posts, blog posts, quote posts, and resource posts) was identified ( $F(3, 51) = 11.22, p < 0.001$ ). Pairwise comparisons using Bonferroni's post-hoc tests, indicated that quote ( $M = 0.87$ ) and resource ( $M = 0.85$ ) posts received significantly more engagement than blog ( $M = 0.40$ ) and video ( $M = 0.34$ ) posts (Table 4 & Figure 2). Table 2 provides the descriptive statistics of the posts type which can be compared with Bonferroni's post hoc results in Table 4. Quote and resource post's engagement were not statistically significantly different from each other. Similarly, blog and video post engagement were not statistically significantly different.

Table 4. Posts Type Engagement Performance (n=55)

	Sample Size	Mean <sup>1</sup>	Standard Error
Video Posts	19	0.34 <sup>A</sup>	0.037
Blog Posts	20	0.40 <sup>A</sup>	0.053
Resource Posts	8	0.85 <sup>B</sup>	0.109
Quotes Posts	8	0.87 <sup>B</sup>	0.187

<sup>1</sup>Means with the same superscript letters are not statistically significantly different.

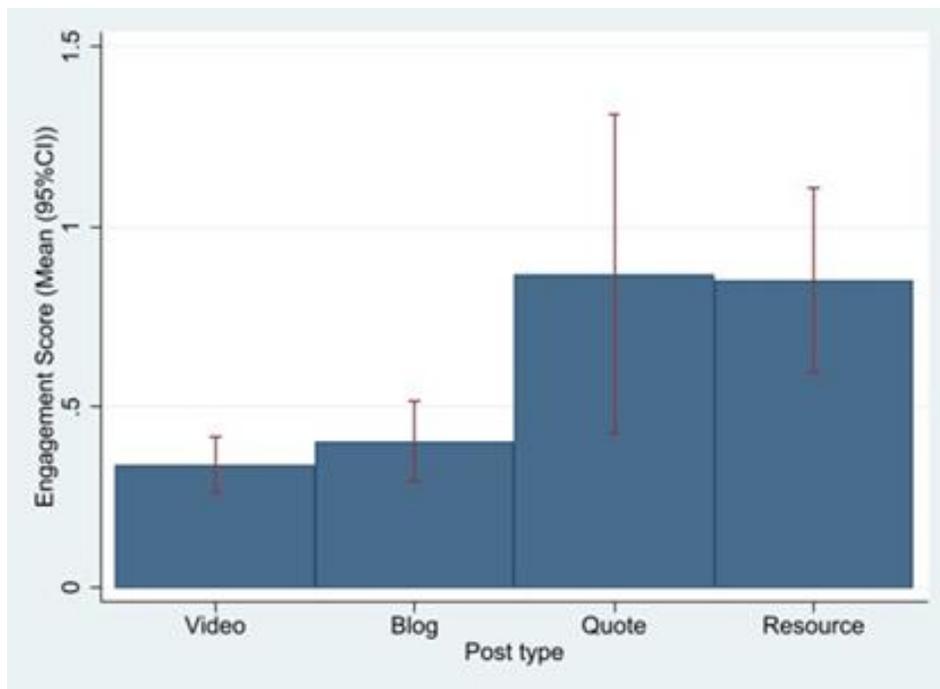


Figure 2. Mean (SE) Engagement Scores by Post Type

## CHAPTER FIVE

### DISCUSSION

This study indicated that Facebook posts in the context of a breastfeeding campaign take a longer duration of time to achieve peak applause relative to amplification. Additionally, this study demonstrates differences in engagement with campaign content across four post types within the context of the Breastfeed4Ghana campaign. Posts that shared a quote from a well-known figure in Ghana and posts that linked to a breastfeeding-related resource had significantly higher engagement compared with posts of a weekly wrap-up video and posts that linked to a blog post written by the campaign about breastfeeding-related topics.

The engagement rate consisted of applause (i.e., number of likes per 100 followers) and amplification (shares per 100 followers), with posts receiving greater applause compared with amplification, as seen in both aims. In a previous analysis from the same campaign, posts also reviewed greater applause (1.59 per 100 followers) relative to amplification (0.26 per 100 followers) on Facebook (Harding et al 2019). This is significant to note in comparison to the finding of this study because both results align with each other. This may imply that for a breastfeeding campaign and potentially any health promotion campaign, the choice of engagement for a user is simply to “like” a post type. This may be because of the simplicity of not having to put

much effort into acknowledging a post that “sharing” or “watching” a post may require.

A study analyzing the best times to post found that for most social networking sites, engagement is highest within the first two hours of posting (Spasojevic et al 2015). This implies that the engagement from a post is seen almost immediately after posting. The findings from the current study may contradict this, as we found that the days for peak performance was 5 days for applause and 3 days for amplification. A potential discrepancy for this may be that the data used in this study for the median number of days until peak performance was during a post acquisition period. This period was dedicated towards attracting followers and attention to the campaign. It is possible that as users began to follow the campaign page on Facebook, it had already been hours or even days before they had the opportunity to engage in it. Tracking engagement posts may be best conducted when a following on a respective platform is relatively established.

The campaign material was designed for the context of Ghana with messages regarding the promotion, protection, and support of breastfeeding (Aryeetey et al 2012). It could be said that the population that would be interested in engaging in such content would primarily be mothers who breastfeed and mothers who are expecting. In a data mining study that set out to predict the performance metrics of Facebook posts, it was found that the post type had most relevance when it came to engagement at 36%, while paid post had

the least relevance at 7% (Moro et al 2016). Typically, mothers and mothers-to-be can be quite occupied with their time and therefore want a post type that is quick and easy to intake. In a different study analyzing restaurants and social media engagement, photos and text posts received the highest amount of likes and comments compared to link and video posts (Kwok and Yu 2013). This may mean that regardless of the time someone may or may not have, they simply prefer post type that will not require much time or effort to engage in. In addition, the type of platform a user chooses to engage leads to different expectations in engagement. For example, Twitter tends to receive engagement in a shorter time span in comparison to Facebook (Spasojevic et al 2015). Due to this, the target audience and their choice of platform is an important aspect to know when considering max engagement performance.

Therefore, a possible explanation for the difference in engagement across post types may be that users of social networking platforms such as Facebook prefer shorter easier to “consume” content, rather than following a link to a different page with a longer blog post or taking the time it takes to watch a video (Kwok and Yu 2013). Kwok & Yu studied effective uses of Facebook in the hospitality industry and concluded that video post should be accompanied by a short description of what the video content means (Kowk and Yu 2013). Another study implies that a Live video (i.e., streaming in real-time) could receive more engagement if they are executed in a way that makes the user feel connected and part of a community (Gruss et al 2020). While the video posts in the current

study were accompanied with a brief description, the videos represented a summative view of the campaign week and were unlikely to tap into a sense of community among online users. This content may have been less likely to garner engagement because it was not novel and was not designed around a sense of community. It is possible that videos with novel content, rather than a review of already posted content, may perform better. It is also possible that in the context of Ghana where phone service and WiFi reliability can vary, videos may not reliability load for viewers.

In the exploration of the performance of the post types, it appears that social networking site users would rather engage in quote posts and resource posts instead of video posts and blog posts. When it came to the number of days until peak performance during the post-acquisition period, users would stay engaged with a post by “liking” it for a longer duration of time (i.e., number of days) rather than sharing it. Although the post types all include themes based around the concept of the promotion, protection, and support of breastfeeding to women in Ghana, video posts received the least amount of engagement while quote posts got the most engagement. Even though “liking” and “sharing” a post are both options for users, the level of engagement reaches a higher peak for simply liking a post. This may suggest that through a future social media health promotion campaign, more effort can be made on producing quote posts and resource posts rather than video posts and blog posts, and applause is most likely to be a user’s choice of engagement instead of amplification.

## Limitations

While future public health campaigns can learn from the findings of this study, the context and topic of other campaigns should be considered and may impact which types of posts garner greater engagement and performance. This study examined four defined post types based on general content (quotes, resources, videos, and blogs), which are not comprehensive of the *types* of posts a campaign may include. Additionally, this study focused its peak performance engagement score based around a post acquisition period, and not during the core campaign. It is possible the peak performance engagement score may see different patterns during the setting of a core campaign where a following is already established. Furthermore, given the limited sample size of posts, the impact of additional post characteristics was not explored. It is possible that emotional appeal could alter performance across post type, or vice versa. Given that the application of social media for health campaigns is still emerging, there is minimal research on post performance within the context of a health campaign. This has limited our ability to compare the findings of this study with other relevant findings. Finally, it is important to note that social networking sites have evolving algorithms that impact what a user is more likely to see and engage in (Etter and Albu 2021).

## Strengths

The concept of having a health promotion campaign through social networking sites is still new and emerging. Notable strengths in this study include

having multiple post types to analyze and compare between a post acquisition and core campaign period. The ability to have data from specific time points allowed for the ability to analyze what the peak performance and growth curves of engagement between applause and amplification are. The advantage of having video, quote, resource, and blog posts allowed for the possibility to determine which post type users engaged with more. The combination of all of this is to the strength of the study in order to provide evidence-based information to future researchers and health professionals.

#### Recommendations for Research and Practice

Future health promotion campaigns may benefit from recognizing that users may prefer content that will not take much of their time. Additionally, recognizing that applause is more likely to sustain a longer period of peak performance engagement that amplification is beneficial to know for the purpose of understanding how much time a post may or may not receive engagement. Alternatively, a health promotion campaign varies much from topic to topic. While the results from this study can be informative to future health promotion campaigns that aim to engage their audience on Facebook, the targeted population for a particular campaign should be considered and materials piloted prior to the campaign. In order to determine which type of content should be posted, considering how it appeals to users' emotions could be beneficial. It has been suggested by Kwok and Yu (2013) that interaction with users on Facebook should be done so in a friendly matter rather than as marketing targets. Kwok

and Yu (2013) describe in the study how the typology of a post is important for the success and effectiveness of communicating with users on social networking sites. A recommendation would be to conduct further evidence-based studies on the specifics of what engages users on social networking sites.

### Conclusion

The number of days it took for posts to reach peak applause was greater compared to the number of days it took to reach peak amplification, and, descriptively, posts received more engagement via applause than amplification. Resource posts and quote posts garnered greater engagement compared with video posts and blog promotion posts. Although there are various post types that can be used on social networking sites for health campaigns, quote posts received the highest level of engagement within the context of this breastfeeding campaign in Ghana.

As the research on the effectiveness of using social networking sites for health promotion continues to rise, a clearer understanding of how post characteristics impact various KPI is needed. Utilizing social networking sites for health promotion continues to be a resource for reaching a large amount of the population for health promotion purposes, with 74% of users active on Facebook daily (Perrin and Monica 2019). This study contributes to further understanding social networking sites as an avenue for health promotion and campaign.

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