

Sharing Information Promoting Unhealthy Behavior through Social Media

Examination of the Users and the Content Using the Case of Pro-anorexia in Tumblr

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Abstract— Social media provides a place where individuals obtain health information and share social support. Previous literature, however, has suggested that social media may promote harm when users share information advocating unhealthy behaviors. By focusing on online discourse around pro-anorexia content on *Tumblr* (the promotion of behaviors related to the eating disorder based on a lifestyle view that being extremely thin is beautiful), this study aims to look at how information about the pro-anorexia perspective is circulated among social media users and the way in which such users can be characterized. Specifically, we plan to analyze the content and examine the shared characteristics of the users who are exposed to similar social media content and have a desire to share it.

Keywords—information propagation; social media; unhealthy behavior; pro-anorexia; *Tumblr*

I. INTRODUCTION

Communication technology today provides a place where individuals obtain health information and share social support [1]. Many people may feel uncomfortable discussing their health issues with their friends, feeling stigmatized or judged. Further, they may think their family or friends lack experience and have limited information about their issues [2]. Research has found social media as influential communication tools in healthcare because it allows people to find like-minded others to communicate with, and makes them feel more comfortable about asking questions or sharing their experiences [3]. Thus, individuals can more actively participate in a conversation around health issues in social media.

In reality, while social media have been promoted as beneficial communication channels in healthcare [4, 5], recent research has found that social media are frequently used to share information promoting unhealthy behavior and that such information easily reaches people who are engaging in the risky health behavior. For example, it is found that like-minded people formed pro-smoking online communities or created virtual smoking clubs. In the communities or the clubs, people share pro-smoking messages from pictures of celebrity smokers to information on smoker's rights [6]. Research also found that people in pro-anorexia communities commonly shared information about effective weight loss including the use of weight loss drugs [7–11]. They shared photos of thin celebrities as motivation, grossly obese people as warnings, and themselves for others to comment on and encourage. They also supported each other in their weight-loss targets and tips

on avoiding detection by professionals and family members when skipping meals. Researchers concluded that overweight and people of normal weight were seen as being weak in the pro-anorexia community, and community members believed strength and beauty were attained through thinness [7–9].

This “dark side” of social media in healthcare should be urgently examined because information promoting unhealthy behavior is prevalent in social media. For example, user-generated videos on YouTube portraying smoking positively far outnumbered those portraying smoking negatively [6, 12, 13], and received a greater number of views [12]. It was also found that smokeless tobacco content on social media was popular among youth and most of the messages positively described smokeless tobacco [14]. The information frequently portrays unhealthy behavior as attractive. For example, many individuals shared videos on YouTube featuring sexy, young, and healthy-looking females smoking [15]. Riskier or more extreme unhealthy behaviors such as self-harm or suicide are also commonly observed. For example, there are numerous reports of non-suicidal self-injury videos and suicide announcement on social media [16–19]. Among suicide-related websites that were available on the Internet and via social media, approximately half were pro-suicide sites. In pro-suicide communities, people shared information on effective methods or stories about persons who committed suicide [20–22]. Some individuals even made ‘suicide pacts’ to commit suicide together.

We conducted a study of sharing information promoting unhealthy behavior through social media. This study reported here focuses on online discourse around pro-anorexia in *Tumblr*. Pro-anorexia, more popularly known as ‘proana’ in social media, is a view that being extremely thin is beautiful, and advocates as a lifestyle choice what the medical establishment and popular belief consider to be an eating disorder. Proana voices have been widely disseminated through social media. Much concern has been expressed about proana because many young people, even as young as 12 years old, have accessed the content. Social media, especially *Tumblr*, were blamed for being responsible for promoting harmful behavior. *Tumblr*'s features allowed people to anonymously share both pictures of extremely thin people and motivational comments. That is, proana advocates did not have to be concerned about being stigmatized by close others in the *Tumblr* space and this space become the most popular sanctuary for their community. As a result, *Tumblr*

administrators decided to shut down their proana communities in 2012. They removed eating disorder-related content and regulated related search terms, such as “thinspiration.” People still are able to find the content, but they now see warning messages with hotlines to call when they type anorexia-related terms. Despite the efforts toward regulation of such content, blog posts promoting anorexia continue to thrive.

Our study aims to explore how information about anorexia is being circulated among *Tumblr* users and who are sharing the similar content. We plan to analyze the content and examine the characteristics of the users who share the similar posts on pro-anorexia.

II. RELATED WORK

A. The Use of Social Media for Unhealthy Individuals

Risky health behaviors, such as anorexia, are often socially unacceptable and individuals who engage in those behaviors often are stigmatized as socially deviant [7, 9]. As a result, they are motivated to hide their risky health behaviors from others, especially from those whom they are emotionally attached, to avoid the hurt they may face.

Thus, individuals engaging in risky health behaviors have a small chance of finding similar others in offline interactions with their family and circle of friends. Typically, individuals who share “acceptable” health concerns easily get information offline about how similar others cope with their health issues. They can learn what health-related perspectives others have, and understand their personal stories by using a common language that need not be explained or justified [23]. Compared with people engaging in risky health behaviors, people engaging in socially accepted health behaviors could easily access information about their health issues and have low barriers to talking about their health behaviors with their close network. On the other hand, since people engaging in risky health behavior have difficulty in finding similar others offline, they might have a lack of knowledge about the behavior, particularly in terms of coping methods.

B. Online Social Support for Unhealthy Individuals

Social support is defined as “the social resources that persons perceive to be available or that are actually provided to them by nonprofessionals in the context of both formal support groups and informal helping relationships [24].” Social support gives people the feeling of being together with others, the notion of being part of a group, spending time together, companionship, and networking [25]. Thus, the freedom to express views and to receive social support is the main reason for individuals to join and use online networks [26]. Studies have found that social media provide emotional support and sociability [1, 27, 28].

It was found that among survivors of childhood cancers, individuals with weak social capital and little support from offline social networks had higher rates of participation in a social network with other survivors [29]. The buffering hypothesis also supports the social support function of social media, positing that a social network helps to shield

individuals from major crises and everyday sources of stress that they may experience [30]. Therefore, supportive messages that provide emotional acceptance, allow cathartic ventilation, and encourage perspective shifting might fulfill needs that are not being met in individuals’ offline lives, and create a place of safety compared to offline social networks that could make them feel stigmatized [2, 9, 31]

C. Aims and Objectives

This study aims to explore how information about anorexia is being circulated among *Tumblr* users. We chose to look at *Tumblr* as the most popular microblogging site for proana communities. Based on the discussion above, we are particularly interested in seeing the characteristics of highly propagated content. Specifically, we will examine whether attitude toward anorexia (pro vs. anti) and affective tone (positive vs. negative) influence information propagation. We are also interested in the shared characteristics between users who post similar content about anorexia. To examine this, we will investigate the association between users’ characteristics, including popularities, network positions, and social media activities, in sharing information promoting unhealthy behavior.

III. METHODS

A. Social Media Data

Publicly available blog posts in *Tumblr* that contained the keyword “thinspo,” “wannarexic,” “proana,” “starvation buddy,” “eating disorder,” and “anorexia” were collected through *DiscoverText*, a cloud-based text analytics program. A total of 36,248 blog posts posted between May 7 and June 6, 2014 were obtained. Among these blog posts, 35,432 (97.9%) were in English, and the other 816 (2.1%) were in other languages. For the analysis, only English blog posts will be included.

Tumblr allows users to choose types of posts they can create. Among English posts, the article type was most frequently propagated (55.7%), followed by the note type (25.0%), the photo-album type (15.1%). A total number of users who shared anorexia content during the data collection period were 162,272. Among them, the user who most actively shared blog posts on anorexia has 368 posts within the data collection time period. The second most active user shared 291 posts. A total of 9 users shared more than 100 posts. On the other hand, 6% of the users (10,457 users) shared only one anorexia-related post.

Through data de-duplication, we detected 4621 clusters which contained multiple posts of the same content. Using near duplicate clustering, similar posts were grouped into existing clusters and 2551 clusters was detected. A total of 13,805 posts were grouped into the clusters and the other 21,627 were singletons. Table I represents number of unites in each blog cluster.

We generated a tag cloud to see relevant words occurring in anorexia-related blog posts. Fig. 1 represents 50 most popular words among the 35,432 posts.

TABLE I. NUMBER OF UNITS IN EACH BLOG POSTS CLUSTERS

| 13,805 blog posts (2551 clusters, 21,627 singletons) | | | | | | | |
|--|-----|-----|-------|-------|-------|--------|----------|
| Cluster ID | 1 | 2 | 3-4 | 5-8 | 9-32 | 35-370 | 237-2551 |
| Units (# of posts) | 142 | 102 | 58-59 | 23-38 | 10-19 | 3-9 | 2 |

B. Coding Criteria

Table II shows the coding criteria for analyzing information propagation. Two coders will be coding a small sample of the data independently, and then machine learning will be applied to deal with the entire population of data. The result will be used to compare highly propagated content and less frequently propagated content.

C. Data Analysis

Chi-square analysis and Poisson regression analysis will be used to analyze highly propagated information compared to less frequently disseminated content in terms of affective tone and attitude. Specifically, we will examine whether posters’ specific attitude toward anorexia or explicit affective tone predict unhealthy information propagation on *Tumblr*. ANOVA will be performed to see the user differences across different clusters.

IV. IMPLICATIONS

Social media provide a space for sharing information promoting unhealthy behavior as well as information promoting healthy behavior. The influence of social media in promoting unhealthy behavior could be greater among people who are engaging in risky health behavior because they may rely more on social media than their offline social circle [9]. Since social media is regarded as an important communication technology to effectively deliver healthcare, understanding the users and the content promoting unhealthy behavior in popular social media is important to be understood.

We believe this study would contribute to healthcare delivery using communication technology by showing how individuals use communication technology to share unhealthy ideas. In addition, this study would contribute to design social media intervention in healthcare by providing the information of individuals who are exposed to the similar unhealthy posts and who have a desire to share the content.



Fig. 1. Tag cloud for anorexia related blog posts

TABLE II. CODING CRITERIA

| | Criteria | Coding list |
|--------------------|----------------|--|
| Meta Categories | Testimony | Self-testimony / Other-testimony / Not identified |
| | Affective tone | Positive/ Negative/ Neutral |
| Content Categories | Attitude | Pro-anorexia/ Anti-anorexia/ Neutral |
| | Purpose | Seeking / Offering |
| | Social support | Informational / Emotional / Esteem / Tangible supports |

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