Textual Analysis of Tweets Associated with Domestic Violence

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Abstract

Background: Domestic violence is a global public health concern as stated by World Health Organization. We aimed to conduct a textual analysis of tweets associated with domestic violence through keyword identification, word trends and word collocations. The data was obtained from Twitter, focusing on publicly available tweets written in English. The objectives are to find out if the identified keywords, word trends and word collocations can help differentiate between domestic violence-related tweets and non-domestic violence-related tweets, as well as, to analyze the textual characteristics of domestic violence-related tweets and non-domestic violence-related tweets.

Methods: Overall, 11,041 tweets were collected using a few keywords over a period of 15 days from 22 March 2021 to 5 April 2021. A text analysis approach was used to discover the most frequent keywords used, the word trends of those keywords and the word collocations of the keywords in differentiating between domestic violence-related or non-domestic violence-related tweets.

Results: Domestic violence-related tweets and non-domestic violence-related tweets had differentiating characteristics, despite sharing several main keywords. In particular, keywords like "domestic", "violence" and "suicide" featured prominently in domestic-violence related tweets but not in non-domestic violence-related tweets. Significant differences could also be seen in the frequency of keywords and the word trends in the collection of the tweets.

Conclusion: These findings are significant in helping to automate the flagging of domestic-violence related tweets and alert the authorities so that they can take proactive steps such as assisting the victims in getting medical, police and legal help as needed.

Keywords: Domestic violence; Twitter; Text analysis

Introduction

The WHO defined "domestic violence" (DV) or "intimate partner" as the "behavior by an intimate partner or ex-partner that causes physical, sexual or psychological harm, including physical aggression, sexual coercion, psychological abuse and controlling behaviors." (1). While it was widely acknowledged that DV is a major human rights violation and a pervasive widespread public health concern, DV has once again come into limelight as a results of imposed quarantine or

social distancing orders in many parts of the world due to the Coronavirus 2019 Disease (COVID-19) outbreak. For example, in a systematic review involving 32 studies on domestic violence cases during COVID-19, it was found that the pandemic had caused an increase of up to 20 – 75% of DV cases depending on countries or regions (2).

However, as DV incidents are often personal and contains sensitive details, DV survivors often have a difficult time admitting their troubles openly out of fear of repercussions of being found out by their perpetrators (3, 4). Furthermore, due to the shameful nature of DV, a woman may also face a lot of family pressure to cover up the DV experiences particularly in a patriarchal culture (5).

On the other hand, social media usage has been ubiquitous and is easily available at almost any individual's disposal at any time. Due to its nature of allowing users to convey their feelings on these platforms, individuals who suffer from DV may similarly express their concerns or may even ask for help from their online acquaintances albeit in a veiled manner. Indeed, due to the advent of web 2.0, social media platforms had been leveraged in recent years to identify public health concerns (6, 7). One of these most used social media platforms is the micro-blogging platform Twitter (8, 9), which allows users to send short messages limited to 240 characters, known as tweets. In a systematic review on the application of Twitter as a health research tool (10), the authors have shown that Twitter had been successfully used, through a variety of approaches such as content analysis, surveillance (11), user engagement and network analysis, for a variety of public health concerns including influenza, vaccination, smoking, diabetes, obesity, Ebola, heart disease mortality, asthma in emergency department and cancer.

Through sentiment analysis, Twitter has also been used to monitor the degree of public health concerns during a spreading epidemic (12). For example, since the beginning of the coronavirus 2019 (COVID-19) pandemic, Twitter had been used to analyse people's opinions and emotions

during the different stages of the pandemic (13) as well as their attitude towards public health COVID-19 policies (14).

As mentioned, one of the unintended consequences of quarantine orders due to COVID-19 is the surge of domestic violence when the survivors were forcibly trapped together with their perpetrators in the same house (15, 16). Yet, despite the increased in DV cases during the COVID-19 pandemic, there had been a paucity of studies on the application of Twitter in this area of public health concern. Twitter was a useful platform to raise the DV awareness (17). On the other hand, Xue et al. (18) found that some of the commonly associated topics and words associated with DV were "awareness month" "victim domestic", "stop domestic" as well as some high profile contemporary anecdotal cases at that time of the data collection including the "Greg Hardy domestic violence" case. However, one of the limitations of the study by Xue et al. (18) was that the authors limited their search to only one keyword, i.e., "domestic violence. With that in mind, we embarked on a study to identify DV-related tweets through text analysis on Twitter using more keywords related to DV.

In addition, a similar study was also carried out using Twitter as a resource for detection of depression symptoms (19). The authors used text mining techniques such as n-gram language models, LIWC dictionaries, automatic image tagging, and bag-of-visual-words to conduct textual analysis of the tweets. They reported 91% accuracy in predicting depressive symptoms. We aimed to conduct a textual analysis of tweets associated with domestic violence through keyword identification, word trends and word collocations

Materials and Methods

Our approach to differentiate between DV-related tweets and non-DV-related tweets was through text analysis by identifying keywords, word trends and word collocations. Fig. 1 shows the approach we used for text analysis on a collection of tweets. This approach was adapted