Suicide and grief: Quantitative analysis of Brazilian publications on Twitter

Suicídio e luto: Análise quantitativa de publicações brasileiras no Twitter

Suicidio y duelo: Análisis cuantitativo de publicaciones brasileñas en Twitter

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ABSTRACT

BACKGROUND: The approach of suicide and suicide grief in online environments is a reality that goes along with technological advances. Used by their users as spaces for expression, social networks are increasingly being a unique source of information for researchers. In this scenario, Twitter establishes itself as an important object of analysis for understanding the experience on the social network with emphasis on approaches in relation to the themes of suicide and grief in order to reflect the impacts and implications for the mental health of its users.

AIM: To analyze the publications of Brazilian public profiles related to thematic of suicide and grief on social network Twitter.

METHODS: Retrospective, documentary research with a quantitative approach that analyzed 1.645 Brazilian publications on Twitter using descriptive statistics, association tests and Multiple Logistic Regression Analysis.

RESULTS: Publications addressing famous people without comments, shares, or likes predominated. Profiles that expressed suicidal behavior on Twitter were more likely to feature pro-suicidal content in their publications.

CONCLUSIONS: Twitter is a social network used by its users to discuss suicide and grief, however, with little approach to questions about suicide prevention and prevention. The network stands out for its unique characteristics, on the part of its users and the usability provided, which allows the publication of content and interactions on these topics in a varied and little investigated ways.

Keywords: Suicide; Bereavement; Social networking; Social media

RESUMO

CONTEXTO: A abordagem do suicídio e luto por suicídio nos ambientes online é uma realidade que caminha juntamente com os avanços tecnológicos. Utilizadas por seus utilizadores como espaços de expressão, as redes sociais são cada vez mais uma fonte única de informação para pesquisadores. Nesse cenário, o Twitter se estabelece como um importante objeto de análise para a compreensão da vivência na rede social, com destaque para as abordagens em relação as temáticas de suicídio e luto, de modo a refletir os impactos e implicações para a saúde mental de seus utilizadores.

OBJETIVO: Analisar as publicações de perfis públicos brasileiros sobre a temática de suicídio e luto na rede social Twitter.

MÉTODOS: Pesquisa retrospectiva, documental de abordagem quantitativa que analisou 1.645 publicações brasileiras no Twitter com uso de estatística descritiva, testes de associação e análise de regressão logística múltipla.

RESULTADOS: Predominaram publicações sobre figuras públicas, sem comentários, partilhamentos ou gostos. Perfis que expressaram comportamento suicida no Twitter eram mais propensos a apresentarem conteúdos pró-suicidas em suas publicações.

CONCLUSÕES: Twitter é uma rede social utilizada por utilizadores de Internet para discussões sobre suicídio e luto, entretanto, com pouca abordagem a questões sobre prevenção e posvenção do suicídio. A rede se destaca por suas

características únicas, por parte de seus utilizadores e da usabilidade proporcionada, a qual permite a publicação de conteúdos e interações sobre estas temáticas de formas variadas e pouco investigadas.

Palavras-Chave: Suicídio; Luto; Rede social; Mídias sociais

RESUMEN

CONTEXTO: Abordaje del suicidio y del duelo por suicidio en entornos online es una realidad que camina con los avances tecnológicos. Utilizadas por sus utilizadores como espacios de expresión, las redes sociales son una fuente de información única para los investigadores. Twitter se consolida como un importante objeto de análisis para la comprensión de la experiencia en la red social, con énfasis en enfoques en relación a los temas del suicidio y el duelo, con el fin de reflejar los impactos e implicaciones para la salud mental de sus utilizadores.

OBJETIVO(S): Analizar publicaciones de perfiles públicos brasileños sobre el tema del suicidio y el duelo en la red social Twitter.

METODOLOGÍA: Investigación documental retrospectiva con enfoque cuantitativo que analizó 1.645 publicaciones brasileñas en Twitter utilizando estadística descriptiva, pruebas de asociación y análisis de regresión logística múltiple.

RESULTADOS: Predominó las publicaciones dirigidas a personas famosas sin comentarios, compartimientos o la opción gusta. Los perfiles que expresaban un comportamiento suicida en Twitter tenían más probabilidades de incluir contenido pro-suicida en sus publicaciones.

CONCLUSIONES: Twitter es una red social utilizada por sus utilizadores para discutir el suicidio y el duelo, sin embargo, con poco enfoque a las preguntas sobre prevención del suicidio y duelo del suicidio. La red destaca por sus características únicas, por parte de sus utilizadores y la usabilidad que oportuniza, que permite la publicación de contenidos e interacciones sobre estos temas de formas variadas y poco investigadas.

Palabras Clave: Suicidio; Aflicción; Red social; Medios de comunicación sociales

Introduction

Suicide is a complex behavior, stigmatized and little understood, that is defined as a self-inflicted fatal act performed by an individual who presents indicators of intention to die (Turecki & Brent, 2016) and is associated with mental health suffering. Every 40 seconds, one person dies by suicide in the world, which is the second leading cause of death among the younger population aged 15–29 (World Health Organization, 2014).

Death by suicide can have an emotional impact on an expressive number of people close to the victim (Cerel *et al.,* 2018). Grief by suicide is associated with doubt, conflict, emotional suffering, stigma, depression, anxiety, and other health problems (Fukumitsu & Kovács, 2016).

Virtual networks have an important role in individuals lives and they have been used by people to express feelings, thoughts, beliefs, and experiences related to suicide and bereavement by suicide (Biddle *et al.,* 2016).

Twitter is one of the most socially impacting virtual networks in addressing suicide on the Internet and its users express their feelings and reactions instantly and dynamically (Ueda, Mori & Matsubayashi, 2017). This social media reaches a wide audience and it allows the visualization of much content without logging in, anonymous access, the use of multiple accounts, and the rapid spread of information. Twitter is attractive to users with suicidal behavior, being one of the most commonly used networks to search for information about the subject (Lee & Kwon, 2018).

Users of virtual social media seek help in these networks and can remain without support or feedback for their anguish and suffering (Chandler, 2018). On the other hand, a study carried out on Twitter showed that the majority of suicide-related publicantions on Twitter received support and help from other users (O'Dea *et al.,* 2018).

Twitter also provides access to detailed information on methods for suicide, suicide pacts and other harmful content and interactions that can encourage the vulnerable user to make negative decisions (Lee & Kwon, 2018).

Many studies focus on suicidal behavior in social media without addressing grief from suicide, which remains unexplored and misunderstood. This is an important research topic that needs to be studied (Padmanathan *et al.,* 2018). The improvement of knowledge about suicidal grief in social media could support the

development of more effective postvention, which is a challenge both inside and outside the virtual world (Miklin, Mueller, Abrutyn, & Ordonez, 2019).

Postvention is a set of actions to support the suicide bereaved in the process of grief with less stress and better health (Erlich *et al.,* 2017; Fukumitsu & Kovács, 2016). Despite the postvention benefits, this approach is still relatively unknown and seldom used (Erlich et al., 2017).

The literature recognizes the internet as a rich source of information related to suicide and there are several studies addressing suicide in social networks. However, suicide grief is a gap that needs to be filled (Moyer & Enck, 2020). The mechanisms related to exposure and vulnerability experienced by the bereaved need to be better understood (Miklin *et al.,* 2019).

Twitter is one of the world's most popular social media platforms. Recently, Twitter reinforced the concern and discussions about suicide, developing more effective security policies in their domains, resources for guidance and online help, with a focus on protecting its users, especially those who demonstrate more risks and self-destructive behaviors through their interactions and publications (Luo, Du, Tao, Xu, & Zhang, 2020; Pourmand *et al.*, 2019), without specific actions related to postvention.

The internet can spread content that promotes the Werther effect, which is characterized by identification with people who killed themselves and copycat effects or contagion. Suicides of public figures (e.g., celebrities and politicians) can temporarily increase the rate of deaths by suicide (Sinyor, Williams & Niederkrotenthaler, 2019). This phenomenon can also be associated with a large reaction from Twitter users (Ueda et al., 2017). Social networks like Twitter could be relevant tools for identifying the signals of identification and vulnerability to the Werther effect.

Considering the importance of knowledge on developing postvention and the gaps in the scientific literature about suicide grief on social networks, this study aims to analyze the publications of Brazilian public profiles related to thematic of suicide and grief on social network Twitter.

Methods

A retrospective, documentary research with a quantitative approach based on the analysis of Brazilian publications about suicide and grief on Twitter. The first

author of the study performed data collection and coding supervised by the second author. We built a guide to evaluate the characteristics of the publications, based on a literature review, considering the main aspects to be analyzed in publications related to the theme of suicide and grief.

In the guide we considered the following variables: the authors gender, the gender of the person mentioned (male, female, or inconclusive), publication type (response to a previous publication, tweet produced by the author himself, or retweet/shared publication), type of person mentioned (family member, public person, other, or does not apply).

We considered as dichotomous variables the mention of suicide method, suicide pact, identification with the person who killed himself/herself, expression of suicidal behavior, judgment/criticism of the grieving person by suicide, supporting prevention, supporting postvention, and the presence of comments, shares, and likes. We coded these variables as "yes" or "no".

The gender categorized as inconclusive received this nomenclature when an analysis of the publication did not allow the identification of the author or mentioned person's gender, since there was no specification or mention in relation to the female or male gender.

We collected the data using the "advanced search", a free and open Twitter tool. We searched for the words "suicide" and "grief" (present in the same publication) and used the language filter to select publications in Portuguese. We did not use the date filter since the collection period was not limited. For the analysis of this study, we considered only the written content of each publication. We did not captured or analyzed images, videos, gifs, polls or redirect links to external pages associated with the selected publications.

This search strategy allowed the identification of public publications (with free access, without the view controlled by the author). The search on the tool resulted in 1.645 publications, which ones were all selected for the search. The first publication collected by the search tool was from 2009 and the last from 2018. We used the screen capture tool to save all the content of the 1.645 publications selected and transcribed each one into an editable document, identified by increasing numbering in accordance with the publications date. We organized and reviewed the data in the editable document.

After data collection, we built a database in Microsoft Excel 2010. We exported the data to a statistical analysis developed in SAS (Statistical Analysis System) version 9.2. We performed a descriptive analysis, association tests with the variables of interest and to verify if the variables of interest are predictors of response Odds Ratio (OR) were calculated using a Multiple Logistic Regression Analysis, setting the significance threshold at $\alpha = .05$ for the tests performed.

This study followed the recommendations of Brazilian Resolution number 466/2012, which authorizes the use and analysis of public data on freely accessible sites without the need for evaluation by an ethics committee. All the principles of anonymity, human protection, security and respect were followed throughout the development of this study.

Results

We analyzed 1.645 publications collected between the years 2009 and 2018 on the topic of suicide and grief on the social network Twitter. We assessed the influence of variables authors gender, gender of the person mentioned, publication type, type of person mentioned, suicide method, expression of suicidal behavior, judgment/criticism of the grieving person by suicide in the outcomes suicide method, suicide pact, identification with person who killed himself/herself, expression of suicidal behavior, judgment/criticism of the grieving person by suicide, supporting prevention and postvention.

We also evaluated the influence of variables authors gender, gender of the person mentioned, publication type, type of person mentioned, suicide method, expression of suicidal behavior, judgment/criticism of the grieving person by suicide, suicide pact, identification with person who killed himself/herself, supporting prevention and postvention in outcomes related to interactions, such as comments, shares and likes.

We verified if the variables of interest were predictors of response by calculating Odds Ratio using the Multiple Logistic Regression Analysis. In the final model, for testing these variables, all those that were in the omitted tables were evaluated.

Among the results of the analysis, primary publications (produced by the authors) predominated (85.29%) followed by those addressing a suicide of a public figure

(54.34%) without explicit criticism/judgment (95.68%), coping resources (89.79%), supporting prevention (93.13%), or supporting postvention (87.90%). Most suicide and grief publications did not address the suicide method (97.93%), suicide pact (97.81%), identification with the person who killed himself/herself (97.33%), or suicidal behavior as feasible for himself/herself (93.74%). Most of the publications did not receive comments (84.01%), shares (82.37%), or likes (78.42%) (*Data not shown*).

In Table 1, we highlight the analysis of associations between characteristics of the publications (gender of the authors of the profiles, gender of the person who killed himself by suicide, types of publications, mention and expression of self-destructive behaviors, prevention and postvention support, among others) with the interactions (comments, shares, likes) seen in the Twitter publications.

Table 1.

Interaction (comments, shares, likes) and characteristics of the publications about suicide and grief (n = 1645) on Twitter (2009–2018)

Variables	Comments		Shares		Likes	
	OR (CI)	p	OR (CI)	p	OR (CI)	p
Author gender						
Male	1.00	-	1.00	-	1.00	-
Female	1.53 (1.06-2.21)	0.02	1.41 (0.99-2.01)	0.06	1.62 (1.16-2.27)	<0.01
Inconclusive	1.59 (1.12-2.25)	<0.01	2.08 (1.51-2.86)	<0.01	2.46 (1.81-3.33)	<0.01
Person mentioned gender						
Male	2.34 (1.35-4.05)	<0.01	1.00	-	1.00	-
Female	1.00	-	1.06 (0.72-1.57)	0.77	0.93 (0.62-1.38)	0.71
Inconclusive	2.84 (1.69-4.76)	<0.01	0.77 (0.57-1.04)	0.08	1.18 (0.88-1.56)	0.27
Publication type						
Response	5.42 (3.90-7.53)	<0.01	0.70 (0.46-1.07)	0.10	1.15 (0.81-1.63)	0.43
Retweet	0.23 (0.03-1.73)	0.15	1.04 (0.42-2.59)	0.93	0.14 (0.02-1.06)	0.06
Tweet	1.00	-	1.00	-	1.00	-
Suicide method						
Yes	1.00	-	1.00	-	1.00	-
No	1.28 (0.46-3.54)	0.63	0.87 (0.37-2.04)	0.74	2.24 (0.77-6.50)	0.14
Express suicidal behavior						

Yes	1.00	-	1.00	-	1.00	-
No	1.03 (0.58-1.81)	0.92	1.54 (0.82-2.88)	0.18	1.07 (0.64-1.78)	0.80
Judgment/criticism						
Yes	0.91 (0.48-1.71)	0.76	1.61 (0.91-2.87)	0.10	1.95 (1.16-3.26)	0.01
No	1.00	-	1.00	-	1.00	-
Suicide pact						
Yes	1.00	-	1.00	-	1.00	-
No	1.86 (0.65-5.32)	0.25	1.11 (0.42-2.97)	0.83	2.72 (0.92-8.05)	0.07
Identification with person who killed himself/herself						
Yes	2.28 (1.07-4.85)	0.03	0.71 (0.26-1.90)	0.49	1.63 (0.80-3.35)	0.18
No	1.00	-	1.00	-	1.00	-
Supporting prevention						
Yes	1.00	-	1.00	-	1.63 (1.04-2.57)	0.03
No	1.39 (0.73-2.65)	0.32	0.68 (0.41-1.13)	0.14	1.00	-
Supporting postvention						
Yes	1.00	-	1.00	-	1.00	-
No	1.63 (0.98-2.69)	0.06	1.92 (1.19-3.09)	<0.01	1.76 (1.16-2.66)	<0.01

Note. Test used = Multiple Logistic Regression Analysis; OR = Adjusted Odds Ratio; CI = 95% confidence interval for mean; p = p-value.

There were more comments and likes in publications by male profiles. Authors of unidentified gender wrote publications that were more shared. Publications about women received fewer comments (Table 1). Publications expressing identification with people who died by suicide or response publications received more comments. In postvention suicide publications, we found more sharing. We identified higher chances of receiving likes in publications expressing judgment/criticism, publications supporting prevention, or those not supporting postvention (Table 1).

The chance of the authors expressing their own suicidal behavior increased in publications mentioning suicide methods, publications not written by males, and those not referring to males (Table 2).

Table 2.

Association among expression of suicidal behavior and other characteristics of publications about suicide and grief (n = 1645) on Twitter (2009–2018)

Variables	Expression of suicidal behavior		
	OR	CI	p
Author gender			
Male	1.00	-	-	-
Female	2.31	1.28	4.20	<0.01
Inconclusive	2.73	1.532	4.872	<0.01
Gender of person mentioned			
Male	1.00	-	-	-
Female	10.46	3.87	28.29	<0.01
Inconclusive	10.58	4.16	26.71	<0.01
Publication type			
Response	1.65	0.99	2.74	0.06
Retweet	1.13	0.14	8.89	0.91
Tweet	1.00	-	-	-
Suicide method			
Yes	4.05	1.43	11.50	<0.01
No	1.00	-	-	-
Judgment/criticism			
Yes	0.31	0.07	1.30	0.11
No	1.00	-	-	-

Note. Test used = Multiple Logistic Regression Analysis; OR = Adjusted Odds Ratio; CI = 95% confidence interval for mean; p = p-value.

The chance of expressing judgment/criticism toward those grieving suicide increased in publications written by females (OR = 2.25; CI = 1.18–4.30; p = .01) and response publications (OR = 2.16; CI = 1.21–3.84; p < .01).

The chance of supporting prevention and postvention (respectively) increased in publications by profiles with unidentified gender (OR = 1.86; CI = 1.14–3.03; p = .01 and OR = 2.12; CI = 1.43–3.16; p < .01) and in tweet publications (OR = 3.34; CI = 1.44–7.77; p < .01 and OR = 2.64; CI = 1.46–4.80; p < .01) (*Data not shown*). Otherwise, the chance of supporting these decreased in publications mentioning males (OR = 0.20; CI = 0.11–0.36; p < .01 and OR = 0.30; CI = 0.20–0.44; p < .01) and females (OR = 0.28; CI = 0.13–0.59; p < .01 and OR = 0.22; CI = 0.11–

0.41; p < .01) (*Data not shown*). Authors expressing suicidal behavior had 10 times the chance of supporting postvention (OR = 9.84; CI = 2.38–40.68; p < .01) compared with those who did not manifest suicidal behavior.

We also tested the associations among mentioning suicide method, suicide pact, identification of the author with the person who killed himself/herself, and other characteristics of the publications. We found the chance of mentioning the suicide method increased only in publications expressing the author's suicidal behavior (OR = 3.54; CI = 1.25–10.02; p = .02) and was reduced in publications toward people with unidentified gender (OR = 0.32; CI = 0.15–0.71; p < .01).

The chance of mentioning suicide pact and identification with the person who died by suicide was higher when the author expressed suicidal behavior (OR = 4.47; CI = 1.90–10.51; p < .01; OR = 14.45; CI = 7.23–28.88; p < .01) (*Data not shown*).

Discussion

Most of the publications did not contain potentially harmful elements (criticism/judgment, identification, suicide method, suicide pact, or expression of suicidal behavior), but they also did not contain protective or preventive content (coping resources, prevention or postvention). People spend a lot of time in virtual environments (Chandler, 2018), which can be useful to promote suicide prevention and postvention, support resources, discussion and resignification of experiences (Pourmand *et al.*, 2019).

In this study, few publications clearly supported prevention (6.87%) or postvention (12.1%). This finding could be related to the strategy of selection of publications (related to suicide and grief) since the literature shows that postvention is a newer and less known perspective than prevention and is insufficiently addressed (Valle & Kovács, 2014). However, postvention is an essential component of suicide prevention, as people grieving suicide also need care and support (World Health Organization, 2014).

The majority of publications addressed the suicide of a public figure (e.g., celebrities or politicians). Thus, there was a preference to approach the suicide of public figures instead of the expression of suicide grief by people close to the user on Twitter. The evidence shows that suicides of public figures can be accompanied by an increase in suicide cases in the population, indicating imitative behaviors (Ueda *et al.*, 2017) or contagion, which can also be identified

in publications (Burnap, Colombo, Amery, Hodorog, & Scourfield, 2017). However, it must be considered that these phenomenal are highly variable (Ueda *et al.,* 2017), and their mechanisms require further investigation (Sinyor *et al.,* 2019).

In this study, the number of publications that received feedback (comments, shares, or likes) was discreet and the interaction of users with the publications was associated with both risk and protective content. Interaction with publications related to suicide might be unattractive for many users, however, the lack of support and feedback for the anxieties and requests for help expressed in publications could be harmful (Chandler, 2018).

The most associated characteristic of the interaction with publications was the "answer" publications, which had approximately five times the chance to receive comments. Responding to publications can be a way of instigating the involvement of users in favor of suicide prevention. The content and effects of responses obtained in online environments need to be carefully investigated (O'Dea *et al.,* 2018). The responses can be positive, caring, empathic, and seeking help or negative with expression of cynicism, indifference and shock (Fu, Cheng, Wong, & Yip, 2013). A study of suicide-related publications on Twitter showed that 25% of responses to publications had suicidal content *(O'Dea et al., 2018).*

Our analysis showed that the expression of suicidal behavior as feasible for oneself was lower among publications published by men, in contrast, the expression of suicidal behavior was greater in publications that mentioned suicides by women. Even with lower numbers in the analysis, we highlight that men sought less help and support in situations of vulnerability and deaths from suicide were more common in this group (World Health Organization, 2014). Regarding women, the literature highlights that the expression of non-lethal suicidal behavior is higher among this group (Shanahan, Brennan & House, 2019).

Other results still need more investigation in the literature, especially the associations between the characteristics of publications and the gender of the author and the person mentioned in the publication, such as expression of judgment, likes, comments and sharing, and favorable positions on prevention or postvention.

The expression of suicidal behavior of the publications was associated with potentially harmful aspects for other users (mentioning method for suicide, suicide pact, and identification with person who killed himself/herself) as well as the recognition of the importance of support for grieving people (postvention). We found that some potential harmful contents were publicated by people expressing their own suicidal behavior.

Twitter is a varied source of information, providing access to contents that are potentially harmful such as detailed information on methods for suicide and suicide pacts (Lee & Kwon, 2018). The presence of harmful content in these spaces creates risks for the experience of users on the network. Therefore, more attention is needed in relation to social networks and the role they play in discussions about content focusing on the themes of suicide and grief, especially regarding suicide prevention and postvention (Miklin *et al*., 2019; Padmanathan *et al.,* 2018; Luo *et al.,* 2020).

Conclusions

We performed a quantitative analysis of publications from Brazilian public profiles on the topic of suicide and grief on Twitter, which allowed the understanding characteristics of this type of publications and associated factors in an innovative way.

Twitter is an important source of data, with significant results for understanding how users use these spaces to address the themes of suicide and grief. We analyzed that most Twitter suicide and grief publications were written by the authors themselves, addressed the suicide of famous people, and did not receive feedback from others. Tweets about grief and suicide mainly had content that was not necessarily harmful or preventive. Individuals who expressed suicidal behavior were more likely to post content harmful to others, but they also had a better chance of recognizing the importance of postvention in the posts themselves.

Among the limitations of this study, we only analyze the content of Brazilian publications (Portuguese language) on the topic of interest and we did not analyze the qualitative contents of the publications, which are aspects that can be explored in future studies. In addition, we did not develop a longitudinal investigation of the publications and profiles that dealt with the subject (such as

the number of tweets published by the same user and recidivism in the publications about suicide and grief).

Implications to Clinical Practice

This study makes an innovative and unique contribution about the expression of grief and suicide in social networks as Twitter. We found associations between author characteristics, content, and interactions with publications that could be helpful in planning prevention and postvention actions. As a technological advance, these new approaches are important for the management of suicide and grief, allowing discussions on these topics that are taboos. The study highlights Twitter as an important data network when it comes to mental health. In addition, it analyzes characteristics on how users have behaved in these spaces, providing information that can subsidize and open spaces for more work in this area, strengthening the development of effective strategies related to the themes of suicide and grief inside and outside online environments.

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