

#Dentalpain: what do the brazilian Instagram® users want to mean?

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Aim: The aim of this study was to evaluate what brazilian Instagram® users manifest when they use #dordedente (#dentalpain in portuguese). **Methods:** The content of 1,000 publications related to dental pain was evaluated. Through print screens posts were collected in two periods (2015 and 2020) and organized into files. Variables related to characteristics of users, publication's type, cause of pain, impact on daily life and actions take to relieve pain were collected. Data analysis was realized through the qualitative methodology of conventional content analysis and a descriptive analysis (95% CI) was performed. **Results:** In the first assessment period 76% of the posts referred to self-declaration of pain. Regarding to the users' characteristics, 54% were female, 20.4% male, and the remaining 25.6% were clinic/ company profiles, or it was not possible to identify the user's gender. Apparently, 34.4% of users were adults, 18.6% were adolescents and only 1.2% were children. On the other hand, in the second evaluation the vast majority (99.6%) were clinic/company profiles. In addition, 90.2% were informative posts and only 3 posts (0.6%) were related to self-declaration of pain. **Conclusions:** The social network Instagram® serves as an efficient means of communication for informative and advertising purposes being an interesting alternative for the dissemination of health information, and as an instrument of health surveillance.

Keywords: Dentistry. Pain. Quality of life. Social media. Toothache.



Introduction

Social networks are social structures that can be formed by people, companies, or organizations, connected to each other, in order to exchange common values, experiences and information through horizontal and non-hierarchical relationships among the participants. In Brazil, according to the We Are Social study, there were 139.1 million internet users in 2017 (66% of the Brazilian population), of which 122 million have profiles in social networks¹.

A recent research realized in 2019 has shown that the number of internet users in Brazil has grown to 149.1 million and the number of active social media users has also grown to 140 million, demonstrating an exponential increase of social media users in the last few years².

According to literature the most common acute manifestation of orofacial pain is odontalgia or toothache, a stressful and intensely painful experience, often leading to absences from school or work, affecting quality of life, being considered as an important public health problem^{3,4}. A research performed in Twitter[®] demonstrated that social networks are used by users to communicate experiences of dental pain, including actions taken to relieve pain and impact on daily life⁵, suggesting that social networks can be an interesting instrument for behaviors analysis and dissemination of health information.

Instagram[®] is a social media that allows users to share photos and videos online to their followers, and at the same time enables the use of hashtags. This social media was created in October 2010 and since April 2012 is part of Facebook^{®6}. A recent research has shown that Facebook[®] monthly active users is declining in some demographics, in contrast, Instagram[®] users who visit the platform daily are growing rapidly since 2016⁷. This mobile social network had reached 1 billion monthly active users in 2020, up from 800 million in January of 2018^{8,9}.

As a relatively new social network, no study analyzed aspects related to toothache manifested by its users. In this sense, the aim of this study was to evaluate what Brazilian Instagram[®] users manifest when they use #dordedente (#dentalpain in Portuguese).

Material and Methods

We evaluated the content of a sample of 1,000 publications related to dental pain utilizing publicly available data from Instagram[®]. In order to carry out the search and reduce the "algorithmic bias" which is nothing more than a term used to describe how we may be influenced by recommendations based on our personal data on the internet¹⁰, we created a profile on the network totally empty and without any connection with another user.

Research was carried out in two assessment periods. The first was realized on July 3, 2015 at 6:00 pm, where we collected the 500 most recent posts containing "#dordedente", which means dental pain in Portuguese, through print screens for further review of their content. The second assessment also collected the 500 most recent publications containing "#dordedente" and it was performed on June 23, 2020 at 6:00 pm. The images were recorded and organized into ten files, each file containing 100 posts, in order to facilitate their analysis.

The first part of our data analysis was performed through the qualitative methodology of conventional content analysis, which is one of the methods used to analyze text data and that is used generally with a study design who aims to describe and interpret a phenomenon as emotional reactions. In this method, the study starts with an observation of the content that we have collected and coding categories are defined during the data analysis^{11,12}.

As the social network Instagram® does not provide the characteristics of users, information such as sex and age were recorded according to the appearance of people in photographs (when possible). The variable age was categorized as adult, adolescent, child, and others (company or clinic profiles, or when it was not possible to identify). And the variable sex was categorized as male, female and others (company or clinic profiles, or when it was not possible to identify).

Cause of pain, impact on daily life, and action taken to relieve pain were considered when they were explicitly declared by the user through the photo or subtitle. The variable pain's cause was categorized as third molar, orthodontic appliance, caries, trauma, infection, and dental eruption. Impact on daily life was categorized as impacting feeding, sleep, leisure, study, and family. And if the user has taken an action to relieve pain, this action was categorized as going to the dentist, taking medications, and resting. Feelings about pain were interpreted through images, statements and emojis, which are specific figures of characters used in social networks. These feelings was categorized as sadness, resignation, faith, irritation, irony, and happiness.

The data of interest were collected and organized into a database created in software Excel, so that the posts could be classified into categories according to their content through the conventional content analysis method. In addition, a descriptive analysis was performed to verify the relative and absolute frequencies of the information and 95% confidence intervals using the software Stata 12.0.

Results

Until the date of the first search, there was 6,101 publications related to the term #dordedente on Instagram®. In the second assessment, which was realized in 2020, the number of posts sharply increased to 40,500 (Figure 1).

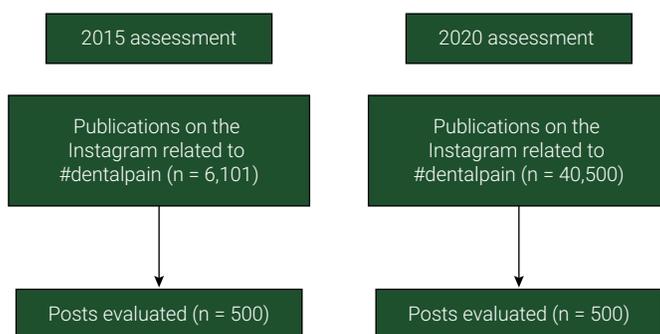


Figure 1. Flowchart of the publications included.

From the 500 analyzed posts in 2015, 76% referred to self-declaration of pain, where the user usually published a photo of him/her in which one could notice through the physiognomy of the person feelings. In addition, the text that followed just below the picture describing the photo often made explicit the annoyance that the dental pain causes and how much it affects the daily routine of people. Figure 2 illustrates changing of type of posts on five-year period. In 2015, more than 80% of posts were classified as personal, while in 2020 90.2% of posts were informative.

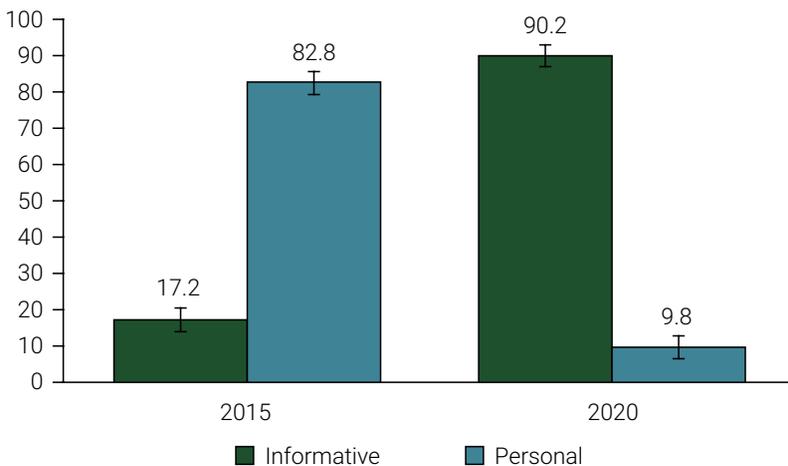


Figure 2. Type of posts containing #dordedente on Instagram® by year of analysis.

Table 1 presents the descriptive analysis of the variables sex, age, self-declaration of pain, and declaration of pain's cause, collected from the publications. In the first assessment, 54% were female, 20.4% male, and the remaining 25.6% were clinic/ company profiles, or it was not possible to identify the user's gender. Apparently, 34.4% of users were adults, 18.6% were adolescents and only 1.2% were children. On the other hand, in the second evaluation the vast majority (99.6%) were clinic/company profiles. In addition, from the personal profiles we could identify that two of them were posted by adult women (0.4%).

In 2015, only 70 users have reported the cause of their pain, being the most frequent reason related to third molars (67%), followed by the use of orthodontic appliances (20%). The eruption of third molars was perceived through the pictures and subtitles that contained hashtags like "#wisdomtooth #thirdmolar #wisdom #wisdomteeth". About orthodontic appliances some users made explicit the pain through phrases like "The thing was so tense that the mouth guard tore with the orthodontic appliance!", and "Enough of hiding the smile and orthodontic appliance, toothache!".

Table 1. Descriptive analysis of the variables sex, age, self-declaration of pain, and declaration of pain's cause, collected from the 1,000 posts evaluated that contained the term #dordedente in the social network Instagram® by year of analysis.

Variable/category	2015			2020		
	n	%	95% CI	n	%	95% CI
Sex (1,000)						
Male	102	20.4	17.0-24.2	0	0	0.0-0.1
Female	270	54.0	49.5-58.4	2	0.4	0.2-0.6
Others	128	25.6	21.8-29.7	498	99.6	98.6-99.9
Age (1,000)						
Child	6	1.2	0.4-2.6	0	0	0.0-0.1
Adolescent	93	18.6	15.3-22.3	0	0	0.0-0.1
Adult	172	34.4	30.2-38.7	2	0.4	0.2-0.6
Others	229	45.8	41.4-50.3	498	99.6	98.6-99.9
Self-declaration of pain (1,000)						
Yes	380	76.0	72.0-79.7	3	0.6	0.4-0.8
No	120	24.0	20.3-28.0	497	99.4	98.3-99.9
Declaration of pain's cause (1,000)						
Yes	70	14.0	11.1-17.4	0	0	0.0-0.1
No	430	86.0	82.6-88.9	500	100.0	99.9-100
Pain's cause (70)						
Third molar	47	67.0	54.9-77.9	0	0	0.0-0.1
Orthodontic appliance	14	20.0	11.4-31.3	0	0	0.0-0.1
Caries	1	1.5	0.03-7.7	0	0	0.0-0.1
Trauma	1	1.5	0.03-7.7	0	0	0.0-0.1
Infection	3	4.3	0.9-12.0	0	0	0.0-0.1
Dental eruption	4	5.7	1.6-14.0	0	0	0.0-0.1

Table 2 presents the descriptive analysis of the variables related to impact on daily life, action taken to relieve pain, and feelings about pain. From the total analyzed posts, 8.7% of the users manifested some impact of dental pain on their daily routine, where feeding (46%), sleep (26.4%) and leisure (19.5%) were the predominant factors. The impact on feeding was manifested mainly through images of special foods like soups and creams, and was perceived also through sentences like "I cannot chew anything... so soup of potato and carrot made by Mom!". There were also sentences that showed the impact on sleep and leisure time, for example: "From the series I hate my wisdom tooth, I want to sleep and I cannot!", and "Starting the holiday at home with style!".

From the total of 1,000 publications, 10.3% of users reported having taken some measure to get around the pain such as going to the dentist (48%), resting (42%) and taking medications (38%). We identified these actions mainly by images of medicines, dental clinics and people resting, and through sentences like "Let's go to the dentist!", "At home lying down... Toothache.", and "About my Friday, medicine and more medicine!".

In almost one third of the publications (26.1%) it was possible to observe the user's feelings regarding toothache. The feeling of sadness was manifested in 46.7% of the posts, through photos of the users with a sad face, crying and no smiles and due to the use of crying emoticons in the subtitle. About the feeling of resignation, where the user was resigned to the pain appeared in 23.4% of the posts, by means of phrases like "Hey pain, I do not listen to you anymore.", "A toast to the pains!", and "And today was like this ... Weekend at home ... All that remains is to enjoy some music !!". And 15.3% of people expressed a feeling of faith and hope in front of toothache, which was perceived by subtitle as "Even if I have no strength left, I will still praise you.", "Thank you Jesus for everything.", and "Luck was cast, the cards are on the table, focus, strength, faith and a single certainty!".

Table 2. Descriptive analysis of the variables related to impact on daily life, action taken to relieve pain, and feelings about pain, collected from the 1,000 publications containing the term #dordedente in the social network Instagram®.

Variable/category (n)	n	%	95% CI
Impact on daily life (1,000)			
Yes	87	8.7	7.0-10.6
No	913	91.3	89.4-93.0
Impact type (87)			
Feeding	40	46.0	35.2-57.0
Sleep	23	26.4	17.6-36.7
Leisure	17	19.5	11.8-29.4
Study	3	3.4	0.7-9.7
Family	4	4.6	1.3-11.4
Action taken to relieve pain (1,000)			
Yes	103	10.3	8.5-12.4
No	897	89.7	87.6-91.5
Type of action taken (128)			
Going to the dentist	48	46.7	36.7-56.7
Taking medications	38	36.9	27.6-47.0
Resting	42	40.8	31.2-50.9
Feelings about pain (1,000)			
Yes	261	26.1	23.4-28.9
No	739	73.9	71.1-76.6
Type of manifested feelings (261)			
Sadness	122	46.7	40.6-53.0
Resignation	61	23.4	18.4-29.0
Faith	40	15.3	11.2-20.3
Irritation	22	8.4	5.4-12.5
Irony	10	3.8	1.9-6.9
Happiness	6	2.3	0.8-4.9

Discussion

The present study was the first to analyze contents related to #dentalpain (#dor-dente) in the social network Instagram®. Our study found that Brazilian users of Instagram® utilize this social media to express feelings/experiences of toothache, including the cause of pain, the impact of this pain on daily life and measures taken to get around the dental pain. Some findings about our research are similar to the results of a study realized in 2009, that found through telephone interviews that the most frequently reported impacts from dental pain on daily life of the participants are difficulty to eating, worry and disruptions in sleep³. Another similarity with this study is related with the measures taken to relieve pain by users. Both studies found that the users reported have used a medicine and/or have gone to the dentist to deal with pain.

The association of toothache and its impacts in many aspects of normal functioning and daily living – eating, drinking, sleeping, talking and socializing – is well documented on literature, as well as the use of nonprescription medicine and home remedies for toothache pain relief^{13,14}. These similarities demonstrate that the findings of a survey on Instagram® are corresponding with results of studies realized by traditional methods of search, suggesting that this social media could be used for surveillance proposes, with special interest for public health.

Besides that, Instagram® serves as an efficient means of communication between the user and his followers, with informative and / or advertising purposes. Our results demonstrated that users also utilize the Instagram® social media in order to inform their followers about dentistry content with the purpose of advertising and publicity. One interesting result that should be highlighted and discussed is the drastic change in pattern of publications from 2015 to 2020. In 2015, 82.8% of posts were personal and mostly about declaration of pain. While in 2020 more than 90% of publications were informative for advertising purposes published by clinic/company profiles. In the recent digital transformation, social media has offered a social communication space with people in timely and cost-efficient way, resulting in an efficient manner to establish relationships with patients and do marketing¹⁵. In this sense, Instagram® plays an important role in dentistry and it has been extremely used by dentists with advertising purposes, which explains this great change in pattern of publications over time, where we have a lot more publications related to information and marketing than personal manifestations. Another aspect that could directly influenced the change over time is the big number of dentists in Brazil, with almost 350,000 professionals in 2020¹⁶. This high number leads to a very competitive market, where professionals put their best efforts to attract patients for the private practice.

Another research that has results corroborating with ours, was published in 2011 and evaluated the content of tweets relating to dental pain from Twitter⁵. They found that the majority of tweets analyzed were statements suggesting that the users were experiencing a toothache and the vast majority of these statements connoted some negative or even catastrophic association with the experience. An example of a tweet published by a user that express a negative and suffer experience is: "ugh!! my toothache is killing me!! PAIN GO AWAY!!"⁵. As well as in our study, where in

more than half of the posts it was possible to observe the user's feelings regarding toothache. The feeling of sadness was the most manifested in analyzed posts and resignation's feeling was the second, reinforcing the relation of the experience of dental pain and negative impacts in the user's quality of life expressed in different social networks. Other important and similar result to our study was the most frequent actions taken to relieve pain reported by the users of Twitter, that were going to the dentist, taking medications including analgesics and antibiotics, and seeking advice from the Twitter community⁵. These results suggest that social networks are not only efficient means of communication but also a good method to evaluate the activities that are being impacted and the measures that are being taken by the people in front of some situation, reinforcing the idea that they could be used as an instrument of health surveillance.

In this same network, another study conducted in 2014, through the qualitative analysis of posts related to orthodontics, demonstrated that online social networks can become a powerful complement to traditional sources of health information, and in addition, the study has shown that the users of the research use the Twitter® social network for the purpose of expression of feelings¹⁷.

Given these findings, we can see that social networks can be beneficial and useful for both professionals and patients. The social network Instagram® has several advantages. First, is the abundance of real-time data. The use of real-time updates averts retrospective reports and creates greater accuracy and sensitivity in the measurement of behavioral responses to pain. Another advantage of Instagram® is that the users can access the network on smartphones or tablets, increasing the frequency of use and posting. Moreover, in the case of professionals of health, Instagram® could be useful to disseminate health information, do marketing, and guide their followers how to face some kind of difficulty in the face of dental pain or any other health problem.

Health surveillance actions which have as principle to observe and analyze the health situation of the population articulating themselves in a set of measures aimed to control determinants, risks and damages to health¹⁸, could also be put into practice in social networks, where one could analyze in part the health situation and behaviors of the population and thus, to promote virtual actions aiming, besides controlling determinants, to disseminate health information.

Dental caries is still a major health public problem in most countries, in which 60–90% of children and the vast majority of adults are affected¹⁹, being also considered one of the main causes of dental pain^{20,21}. However, in our study the main responsible for pain were the third molar and the use of orthodontic appliances. Dental caries was one of the causative factors that appeared less frequently in the posts.

This divergence of results can be explained by the individual socioeconomic characteristics of the users. The social determinants experienced throughout life are strongly associated with the occurrence of caries disease^{22,23}. However, people who have access to smartphones and computers are people with greater purchasing power, having more access to information and knowledge, and consequently having a lower risk factors for the development of caries disease. On the other hand, the

use of orthodontic appliances and third molar extraction involves the person having a higher purchasing power to access these treatments, and it may be for these reasons that these two factors appeared more frequently as causes of dental pain in our study.

Another possible explanation for these findings could be related to the impressions that users would like to manifest to their followers. Social networking has become an increasingly efficient mean for people to exhibit themselves, mainly through the selfies, where the users tend to expose their "media identities" exalting perfect images of themselves and avoiding sharing those more modest²⁴. In this way, pain related to third molar and orthodontic appliances could be interpreted as more socially accepted events, because are not associated with disease or lack of self-care and can be considered as unavoidable. On the other hand, causes of caries are well known by population, referring to absence of hygiene and diet rich in sugars, which denotes bad impressions of individuals.

However, our study has some important limitations that have to be discussed. First, our research was carried out limiting the language to search only Portuguese posts affecting the representativeness of the study population and limiting the extrapolation of the results. On the other hand, Brazil is one of the countries in the world with the largest number of social media users and this must be taken into account². Besides that, posts without the hashtag were not evaluated, so the manifestations about dental pain on Instagram[®] may have been underestimated. In relation to the use of social networks as an instrument of health surveillance is interesting, but we have to consider that not all users who feel pain will manifest it in the networks. This is also important in terms of interpretation and extrapolation of data. The use of social media and websurveys is dramatically growing in the recent time, being an accessible alternative to do research during pandemic of COVID-19²⁵. Due to these limitations, is necessary that future studies be performed to determine the validity of Instagram[®] of a data source.

In this study, we have shown that Instagram[®] users share online their experiences of toothache, involving the cause's pain, feelings about the pain, and measures taken to relieve pain. In this way, the social network Instagram[®] serves as an efficient means of communication between the user and his followers. In addition, this social network is also used by dentists for informative and advertising purposes being an interesting alternative for the dissemination of health information, and as an instrument of health surveillance.

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