



The Open Dentistry Journal

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RESEARCH ARTICLE

The Perception and Usage of Fake Braces: Twitter Content Analysis

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Abstract:

Introduction:

Financial concerns deter many people from seeking orthodontic care. Fake braces replicate the real orthodontic braces but are not functional and are priced at a lower cost. These products are available through illegal and unregistered merchants, who use social media for advertising their products. This study aimed to analyze Arabic Twitter posts related to fake braces.

Methods:

Tweets were collected from Twitter API v2 using Python. The search was limited to the Arabic language, using keywords such as “fake braces” and “fashion braces.” Tweets were collected in the period from January 1, 2020, until July 31, 2021. Both sentiment and thematic analyses were performed.

Results:

788 tweets met the inclusion criteria, 660 of which were advertisements. The rest of the tweets (n = 128) were categorized into four main themes: rejecting the idea of fake braces (49.2%), having the intention to buy fake braces (32.0%), using/used fake braces (14.1%), and accepting the idea of fake braces (4.7%). Sentiment analysis showed that more than half of the tweets (55.5%) were negative and mainly involved sarcastic language (65.8%).

Conclusion:

Although many of the tweets were against the use of fake braces, a sizable number of advertisement tweets promoted fake braces. Efforts should be made to educate the public about the risks of using fake braces and to emphasize the importance of seeking a licensed orthodontist for treatment. In addition, health authorities must establish laws and policies and enhance surveillance to control social media content advertising these harmful products.

Keywords: Social media, Oral health, Orthodontic appliances, Sentiment analysis, Twitter, Fake braces, Dentistry, Orthodontics.

Article History

Received: October 20, 2022

Revised: February 8, 2023

Accepted: February 16, 2023

1. INTRODUCTION

Orthodontic treatment is generally sought to improve a patient's appearance [1]. However, this treatment should not be performed solely based on a patient's perception of their need for orthodontic treatment. Orthodontists must complete a comprehensive clinical examination to confirm this perception and provide an all-inclusive understanding of the malocclusion situation [1, 2]. Many people are deterred from seeking care for either functional or appearance reasons because of cost concerns [3]. The high cost of orthodontic treatment at private clinics, the long waitlist at government dental clinics, the un-

availability of orthodontic treatment, and the lack of public knowledge about the risks associated with orthodontic treatment have contributed to the impression that wearing braces makes one look stylish and educated [3, 4]. A large amount of media advertising influences consumer decisions, and general dentists are increasingly acting as trusted advisers, often offering treatment rather than referrals to orthodontists [3].

Fake braces, also known as fashion braces, replicate real orthodontic braces but are not functional [4]. The first media coverage of fake braces came from Thailand in 2006 [5]. Although fake braces serve no therapeutic purpose, black market braces are marketed toward teenagers who seek the luxury status that is attributed to the wearing of this type of

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braces [4]. In addition to traditional metal braces, colorful rubber bands can be customized with ornamentation, such as diamonds or cartoon characters [4].

A previous study examined how fake braces impact oral health-related quality of life. Hakami *et al.* revealed that fake and therapeutic braces negatively affected physical disability and functional limitation; however, the negative effect for therapeutic braces was significantly greater [6]. A cross-sectional study found that the use of fake braces is affected by factors such as perceived susceptibility, family socioeconomic status, and risk severity [7]. 36.4% of dental offices in Jeddah, Saudi Arabia, offer decorative braces [8]. Additionally, 74% of fake braces are installed by patients or their friends and family using over the counter glue [8].

Social media has become a valuable tool for providers of fake braces and patients seeking to acquire fake braces [9]. Twitter and Instagram are popular platforms for patients to discuss their orthodontic treatment, attitudes, and emotions [9]. In addition, as social media has become a popular platform for marketing; the younger generation spends many hours on social media sites, and it is easy for illegal fake braces providers to draw on this vulnerability and supply the market [10].

This study aimed to analyze Arabic Twitter posts related to the perception and use of fake braces.

2. METHODS

The protocol of this study was reviewed and approved by the Institutional Review Board at at King Abdulaziz University Faculty of Dentistry (#269-08-21).

Tweets were collected from Twitter API V2 using Python. A Jupyter notebook was used(Jupyter notebook is a browser-based interactive computing notebook which works with codes in different programming languages), which is built into the Anaconda tool (version v22, Anaconda Inc., Austin, TX, USA). We used an academic research product track developer account; this track allowed us to have a full archive search, including searching the full history of public tweets using filters and operators, with up to 10 million tweets collected per month [11].

The search was limited to Arabic language tweets, using keywords such as “fake braces” and “fashion braces” in Arabic. Tweets were collected in the period from January 1, 2020, until July 31, 2021. The collected tweets were stored in CSV format and then exported into Microsoft Excel (version 14.0.7, Microsoft, Redmond, WA, USA). The exported data included tweet text, author username, number of retweets, number of favorites, geolocation, and date and time of posting.

Tweets were then selected according to the inclusion and exclusion criteria. Inclusion criteria: tweets related to fake braces; exclusion criteria: unclear content, not in Arabic, and duplicates.

The authors did screening, coding, and analysis manually and independently. Each tweet was categorized into positive, negative, or neutral and then into themes and subthemes

according to its content, following the steps and guidelines of Braun and Clarke [12]. The tweets were then grouped and refined to finalize the themes and subthemes. Disagreements between authors were resolved by discussion and consensus.

All tweets were entered into IBM SPSS Statistics V25.0 for counting and distribution analysis.

3. RESULTS

A total of 1100 tweets were collected, and 788 met the inclusion criteria (Fig. 1). Most of the resulting tweets were advertisements (n=660), mainly from online stores. Still, there were also some advertisements from dental clinics and medical/dental supply stores (Table 1).

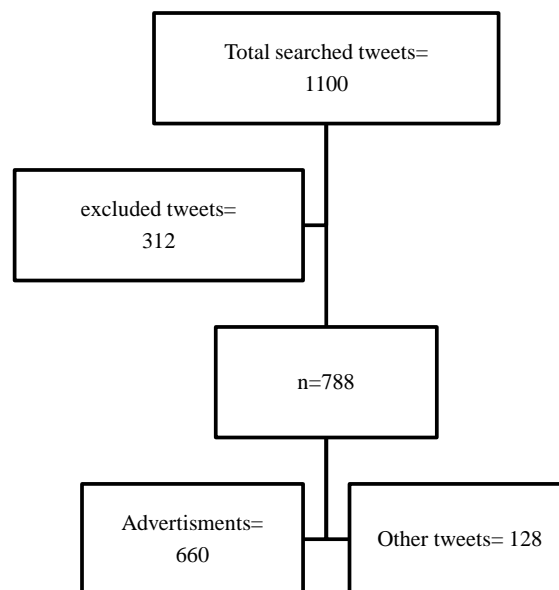


Fig. (1). Flowchart of the searched, included, and excluded tweets.

Table 1. Distribution of advertisement tweets.

-	Year n (%)	
	2020	2021
Online store	190 (99.0)	464 (98.9)
Clinic	2 (1.0)	3 (0.6)
Medical/dental supply store	0 (0.0)	2 (0.4)
Total	192	469

Other than advertisements, the rest of the tweets (n = 128) were categorized into themes and subthemes (Table 2). The first theme was “Have the intention to buy fake braces,” which included tweets where users asked about clinics and stores that provided fake braces, the advantages and disadvantages of using fake braces, and prices (Table 2). This theme also included tweets demonstrating the reasons users desire to buy fake braces, which were mainly because of aesthetic reasons and the price difference between fake braces and orthodontic treatment (Table 2). Some users offered fake braces as an award after a contest (Table 2); these tweets were retweeted/favorited 30 times combined (results not shown).

Table 2. The distribution of Tweets across themes and subthemes.

Theme	Number	%	Subtheme	Number	%
Have the intention to buy fake braces	41	32.0	Asking about clinics that provide fake braces.	12	29.3
			Asking where to buy fake braces.	2	4.9
			Asking about the pros and cons of fake braces.	1	2.4
			Asking about the prices.	1	2.4
			Asking about fake braces.	2	4.9
			Excitement to use it.	2	4.9
			Praising fake braces.	2	4.9
			Expressing the desire to use it.	8	19.5
			Stating that aesthetics is the reason to use it.	4	9.8
			Stating that Price difference is the reason to use it.	2	4.9
			As a prize for a contest.	5	12.2
Using/used fake braces.	18	14.1	Expressing that they had used fake braces before and were happy about it.	3	16.7
			Stating the reason they used fake braces is because aesthetic.	1	5.6
			Regretting to use it.	1	5.6
			Complication with the usage: Change in appearance.	1	5.6
Rejecting the idea of fake braces	63	49.2	Complication with the usage.	12	66.7
			Sarcasm.	48	76.2
			Despise after past orthodontic treatment.	3	4.8
			Rejecting who use it.	3	4.8
			No need for using it.	1	1.6
Accepting the idea of fake braces	6	4.7	Denial of the existence of fake braces.	1	1.6
			Wondering how people use it and buy it.	7	11.1
			No harm of using it.	4	66.7
Total	128	100	Increase beauty.	2	33.3
			-	-	-

The second theme included tweets related to users who used or were using fake braces. Around 66% of the tweets in this theme were about the complications and side effects of using fake braces, which included changes in appearance, caries, infections, halitosis, pain, difficulty in cleaning the braces, and mouth ulcers (Table 2). Around 16% of the tweets represented users expressing satisfaction with the experience (Table 2).

Most of the tweets were grouped into the third theme, “rejecting the idea of fake braces.” 76% of these tweets were sarcastic (Table 2). The last theme comprised tweets where

users advised people to use fake braces, claiming it is a good alternative to orthodontic treatment and will cause no harm (Table 2).

The tweets were also categorized into positive, negative, and neutral. More than half of the tweets (55.5%) were negative and mainly involved sarcastic language (65.8%) and the disadvantages of using fake braces (21.9%) (Table 3). Positive tweets revolved around the idea of wanting to buy fake braces (32.0%) and advice on why people should use them (24.0%) (Table 3). The neutral tweets were mostly questions regarding different aspects of fake braces and past experiences relating to these fake braces (54.8%) (Table 3).

Table 3. Distribution of positive, negative, and neutral tweets across themes n (column %).

Themes	Subthemes	Positive (n=25)	Neutral (n=32)	Negative (n=71)
Have the intention to buy fake braces	Asking	1 (4.0)	18 (56.3)	0 (0.0)
	Excitement	1 (4.0)	0 (0.0)	0 (0.0)
	Praise	2 (8.0)	0 (0.0)	0 (0.0)
	Expressing the desire to use it	8 (32.0)	0 (0.0)	0 (0.0)
	Stating the reasons why to use it	3 (12.0)	3 (9.4)	0 (0.0)
	As a prize for a contest	0 (0.0)	5 (15.6)	0 (0.0)
Using/used fake braces	Expressing that they had used fake braces before and were happy about it	3 (12.0)	0 (0.0)	0 (0.0)
	Stating the reason they used fake braces is because of aesthetic	1 (4.0)	0 (0.0)	0 (0.0)
	Regretting to use it	0 (0.0)	0 (0.0)	1 (1.4)
	complications	0 (0.0)	0 (0.0)	12 (21.9)

(Table 3) contd.....

Themes	Subthemes	Positive (n=25)	Neutral (n=32)	Negative (n=71)
Rejection the idea of fake braces	Sarcasm	0 (0.0)	1 (3.1)	48 (65.8)
	Despise after past orthodontic treatment	0 (0.0)	0 (0.0)	3 (4.1)
	Rejecting who use it	0 (0.0)	0 (0.0)	3 (4.1)
	No need to use it	0 (0.0)	0 (0.0)	1 (1.4)
	Denial of the existence of fake braces	0 (0.0)	0 (0.0)	1 (1.4)
	Wondering how people use it and buy it	0 (0.0)	5 (15.6)	2 (2.7)
Accepting the idea of fake braces	Advice	6 (24.0)	0 (0.0)	0 (0.0)

Sarcastic tweets had the most favorites; one sarcastic tweet had 56 favorites, followed by another negative tweet with 24 favorites mentioning complications such as ulcers and halitosis (data not presented). The highest number of favorites among the positive tweets was 17; the user who posted this tweet expressed their happiness in having and using fake braces (data not presented).

4. DISCUSSION

With the growing influence of social media, promoting fake braces as teeth accessories by unqualified personnel or dental offices is alarming [13]. Social media content analysis can shed light on the knowledge and behavior of the public toward using these devices. Moreover, this analysis will aid in developing a profound understanding of a certain population's cultural directions, motives, experiences, and expectations [14]. Therefore, this study explored the perception and use of fake braces by analyzing Twitter posts.

Although fake braces have started in Southeast Asia, their use has expanded to the Far East and Middle Eastern countries. Recently, it has been noted that online companies in the United Kingdom and the United States have started to sell aligners without the direct supervision of an orthodontist; these are called do-it-yourself (DIY) orthodontics or direct-to-customer (DTC) orthodontics [15, 16]. These companies include Smile Direct Club and Smile Life [17], and they mainly operate through three steps: sending impression kits to homes, fabricating treatment plans, and sending the aligners [17].

A cross-sectional study was conducted in the U.S. to provide insight into the experiences of people who use at-home aligners [16]. More than half of all respondents sought advice from a dentist prior to purchasing at-home aligners [16]. Nearly all respondents opted for at-home treatment due to affordability; about two-thirds pointed to convenience [16].

Concerns regarding these companies have been raised through multiple associations and officials. The American Association of Orthodontists (AAO) has stated that such services are “illegal and create medical risks”. [18] The British Dental Association (BDA) was also concerned about these “dangerous” services [18]. They cited the following reasons for concern: the type of oral analysis held to come up with the treatment plan, the oral condition of the patients and whether they have an existing dental disease such as untreated caries and periodontal problems, and the patient’s inability to actually know the clinician managing their case [18]. As of October 2019, the Governor of California signed the bill into law, which “includes significant oral policy changes related to the

regulation of self-applied orthodontic treatments administered via telehealth and other technological platforms” [19]. Currently, these devices are widely spread all over the globe, mainly through social media or websites. This alarming issue affects entire populations’ oral health and safety.

According to Saudi Arabia's social media statistics, Twitter is one of the most popular social media platforms in Saudi Arabia, used by nearly 71% of the population [13]. Although the reliability and validity of social media content are not guaranteed and can be confusing or misleading, plenty of Saudi people have used Twitter as a source of health-related information and even to seek treatment [20].

In our findings, the majority of tweets were related to the marketing and advertising of fake braces. Most of the online stores promoted their use without clinical or radiographic evaluation and without explaining their negative impact on oral health. Most advertisers used subliminal advertising, including tempting and hidden messages to promote fake braces. Advertisers also used deceptive advertising by providing information about the nature, properties, and consequences of these appliances were misleading. Last but not least, some of the advertisements were abusive, as several stores used persuasive language to convince consumers to use fake braces as contest prizes. These findings are considered misconduct, and it extremely concerns how public consumers can easily and directly access unlicensed orthodontics through social media. Additionally, some dental offices used trending hashtags and mentioned social media influencers in their marketing posts to reach a broader audience. Our results address the magnitude of the unfortunate marketing of this malpractice, and we emphasize the need to track the content of online platforms by health authorities in Saudi Arabia as the market of unlicensed orthodontics may flourish in the next few years.

Some of the tweets in our study reflected the population’s positive impressions regarding the intention to get fake braces, particularly with the low prices offered. This can be quite tempting, especially for those who can easily be influenced by their online peers [21], and many users favorited and retweeted these posts to their followers. On the other hand, the majority of negative tweets were sarcastic. Yet, the reasons behind this sarcasm were difficult to evaluate, as the users may use this approach to conceal their inability to buy or use fake braces as their peers. These results highlight how misconceptions can easily circulate among the general population.

Although it is difficult to evaluate the content on Twitter regarding the use of fake braces, especially over a long period of time, our findings suggest the problematic use of illegal

orthodontics among the Saudi population. This study highlights the role of social media in marketing fake braces and the magnitude of this issue. Therefore, health authorities must establish rules and policies and enhance surveillance to control the social media content that promotes this illegal practice. Moreover, the encouragement of qualified orthodontists' engagement with the public through online platforms (*e.g.*, live interaction, online lectures, *etc.*) would be potentially beneficial in limiting the spread of such misconduct. Additionally, efforts should be directed at identifying vulnerable populations for targeted awareness campaigns and education about the consequences of this trend in oral health.

One of the limitations of this study is that we confined our analysis to Twitter only; other popular social media platforms were not investigated. However, as mentioned, Twitter is considered one of the most used social media applications in Saudi Arabia.

As a drawback of content analysis studies, we were not able to identify the characteristics of the study population who reacted toward fake braces and the possible factors that would affect the desire for their use, such as population's demographics and socioeconomic status. Although we restricted our analysis to tweets in Arabic, Saudi Arabia has a diverse population [22], and incorporating English in future studies with the use of geo operators to limit the results to Saudi Arabia would help lead to more comprehensive view of the community.

This study collected tweets during a growing period of online marketing [14]. The use of the Twitter API v2 academic research product track was a strength, as it helped us gain a better insight into Twitter data by allowing access to the full archive of public tweets using additional advanced query operators. In addition, we included both qualitative and quantitative analyses of Twitter posts to the unfiltered opinions regarding fake braces among the Saudi population.

CONCLUSION

This study aimed to explore and analyze Twitter posts related to the use of fake braces. Although many of the tweets were against the use of fake braces, a sizable number of advertisement tweets promoted fake braces. Negative tweets included mainly sarcastic language, while positive tweets highlighted the desire to buy and use fake braces. Efforts should be made to educate the public about the risks of using fake braces and emphasize the importance of seeking a licensed orthodontist for treatment. In addition, health authorities must establish laws and policies to control the social media content that promote and advertise these harmful products.

Future studies should broaden their analysis to measure the severity of the content rather than focusing solely on prevalence. Additionally, it would be beneficial to interview some platform users to better understand the perceived impact of social media, thoughts, and actual behavior regarding the use of fake braces.

LIST OF ABBREVIATION

DIY	=	Do-It-Yourself
DTC	=	Direct-To-Customer
BDA	=	The British Dental Association
AAO	=	American Association of Orthodontists

ETHICAL STATEMENT

This study was reviewed and approved by the Institutional Review Board at King Abdulaziz University Faculty of Dentistry (#269-08-21).

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

The authors would like to thank Dr.Maha Alsharif for her valuable contribution to this research.

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