Oral and Maxillofacial Surgery
https://doi.org/10.1007/s10006-022-01095-6

ORIGINAL ARTICLE

The global reach of social media in oral and maxillofacial surgery

Jack A. Harris[1] · Nicole A. Beck[1] · Cassi J. Niedziela[2] · Gerardo A. Alvarez[1] · Sheridan A. Danquah[1] · Salim Afshar[2,3]

Received: 13 January 2022 / Accepted: 19 June 2022

Abstract

Purpose Social media use among oral and maxillofacial surgeons (OMSs) has grown in recent years, serving as an important resource for the dissemination of medical/surgical knowledge, research, education, diplomacy, and advocacy. However, no studies have attempted to characterize the global reach of social media in OMS.

Methods This study examined the profile activity, content performance, and demographic characteristics of followers from a single OMS-related Instagram account. Variables assessed include the total number of followers since the account's inception, profile views over the selected time period, and unique media content posts, as well as likes, comments, saves, impressions, and reach for all media content posts. The top 45 countries, cities, and languages based on each follower's geolocation and user settings were also included.

Results There were 9569 followers of which 6208 (64.9%) were listed as public accounts. Of the 6208 followers with public accounts, 2496 (40.2%) were female. The countries with the most followers included the United States (31.7%), India (12.5%), Malaysia (5.3%), Mexico (4.0%), and Pakistan (3.6%). The cities with the most followers included New York, New York (8.9%), Boston, Massachusetts (5.2%), Cairo, Egypt (4.3%), Santiago, Chile (3.7%), and Karachi, Pakistan (3.5%).

Conclusion OMS-related social media is uniquely positioned to facilitate global collaboration and augment the dissemination of surgical knowledge and expertise. This information is critical in understanding the distribution and demographics of the OMS workforce, trainees, and affiliates around the world.

Keywords Oral surgery · Social media · Surgical education · Developing countries · Capacity building

Introduction

For years, social media platforms such as Instagram, Facebook, Twitter, Snapchat, and LinkedIn have played an integral part in both our personal and professional lives. More recently, however, social media has become an important resource for healthcare professionals and organizations aiding in the dissemination of medical knowledge for patient care and safety, research, diplomacy, advocacy, and education. Specific examples of social media use in healthcare include the circulation of novel peer-reviewed literature, social and medico-political campaigns, the promotion of health behavior, direct patient engagement, and professional networking [1].

Oral and maxillofacial surgery (OMS) has seen a contemporary boom in social media use and engagement, likely due to the extensive changes to daily life brought forth by the coronavirus disease 2019 (COVID-19) pandemic. For example, a recent update on social media use among OMS residency programs demonstrated an exponential increase in OMS residency-affiliated Instagram accounts between June 2020 and December 2020 [2]. Furthermore, numerous individuals have called for the expansion of OMS journals' presence on social media to enhance publication readership, to share medical information, and to encourage interdisciplinary collaboration among medical professionals on a global scale [3]. Despite the profession's recent interest in increasing its social media footprint, no studies have attempted to characterize the global reach of social media in OMS.

The overall objective of this study is to assess the global reach of OMS through social media by examining user

✉ Jack A. Harris
Jack_harris@hsdm.harvard.edu

[1] Harvard School of Dental Medicine, 188 Longwood Avenue, Boston, MA 02115, USA

[2] Department of Plastic and Oral Surgery, Boston Children's Hospital, Boston, MA, USA

[3] Program in Global Surgery and Social Change (PGSSC), Harvard Medical School, Boston, MA, USA

Published online: 24 June 2022

engagement patterns of a single OMS-related Instagram account. In doing so, the authors hope to characterize the following demographic information of its followers: geolocation (both country and city), languages spoken, age, gender, and engagement patterns. The authors hypothesize that OMS-related Instagram accounts are able to engage a diverse array of users on a global scale. This information is critical in understanding the distribution and demographics of the OMS workforce, trainees, and affiliates around the world.

Methods

Study design and population

This single-case study examined the profile activity, content performance, and demographic characteristics of followers from a single OMS-related Instagram account from its creation on November 8, 2020 to October 18, 2021. Material published on the Instagram account is intended for dental students interested in careers in OMS as well as OMS trainees, practitioners, and affiliates located globally. Published content includes OMS-related educational content, advertisements for OMS conferences and speaker events, and promotions of recent OMS-related academic publications. Only those individuals who were following the Instagram account on October 18, 2021, approved of Instagram's data policy agreement, and listed their individual Instagram accounts as "public" were included in the study. This study was granted exemption status by the Boston Children's Hospital (BCH) Institutional Review Board (IRB-P00040508).

Study variables

Variables include the total number of followers since the account's inception, profile views over the selected time period, and unique media content posts [categorized as follows: (1) educational content; (2) research publications/article links; (3) advertisements for conferences/meetings; and (4) miscellaneous] as well as likes, comments, saves, impressions, and reach for all media content posts. 'Saving' a post allows followers to bookmark certain content in order to revisit it at a later date. 'Impressions' are the number of times each post is viewed by an individual (i.e., if one person views a post multiple times, each view is recorded as an impression). In contrast, 'reach' refers to the number of different people who view a post (i.e., if one person views a post multiple times, all views are recorded as only one reach).

The top 45 countries, cities, and languages based on each follower's geolocation and user settings were also included. A follower's geolocation, which is defined as an individual's geographical location while using an internet-connected device, was determined either by device-based collection which relies on global positioning software (GPS) and/or cellular networks, or by server-based collection which relies on each device's internet protocol (IP) address through a Wi-Fi or Ethernet connection.

Data analysis

The authors extracted data on profile activity, content performance, and demographic characteristics of followers using Iconsquare, which is a high-throughput social media analytics and management software. Descriptive statistics and supporting data analysis was conducted using IBM SPSS Statistics Software Package (SPSS Statistics, Chicago, IL, USA). Datawrapper, which is a graphic design software, was utilized to visualize the geographical distribution of followers.

Results

As of October 18, 2021, there were 9569 followers of which 6208 (64.9%) were listed as public accounts. Of the 6208 followers with public accounts, 2496 (40.2%) were female. The most frequent age of followers was between 25 and 34 years old (37.1%), followed by 18–24 years old (10.7%) and 35–44 years old (8.8%). The profile had 11,796 views with 350 unique media content posts. The most common type of media post was educational content ($n=277$, 79.1%), followed by research publications/article links ($n=35$, 10.0%), miscellaneous ($n=25$, 7.1%), and advertisements for conferences/meetings ($n=13$, 3.7%). Over the lifetime of the account, all media content received a total of 45,790 likes (average likes per media post of 130.8) and a total of 927 comments (average comments per media post of 2.7). There were 8435 saves, 999,838 impressions, and 602,557 reaches over the lifetime of the account (Table 1).

The countries with the most followers included the United States of America (USA) ($n=2001$, 31.7%), India ($n=788$, 12.5%), Malaysia ($n=331$, 5.3%), Mexico ($n=250$, 4.0%), and Pakistan ($n=225$, 3.6%) (Fig. 1a). The cities with the most followers included New York, New York ($n=163$, 8.9%), Boston, Massachusetts ($n=94$, 5.2%), Cairo, Egypt ($n=79$, 4.3%), Santiago, Chile ($n=67$, 3.7%), and Karachi, Pakistan ($n=64$, 3.5%) (Fig. 1b). The most commonly used languages among followers include English (USA) ($n=4164$, 59.6%), English (UK) ($n=955$, 13.7%), Spanish (Latin America) ($n=350$, 5.0%), Portuguese (Brazil) ($n=166$, 2.4%), English (India) ($n=146$, 2.1%), and Arabic (World) ($n=123$, 1.8%) (Table 2).

Table 1 Summary statistics of OMS Instagram account

Variable	Value
Total followers	9569
Profile views	11,796
Media posted	350
Likes received	45,790
Average likes per media	130.8
Comments received	927
Average comments per media	2.7
Saves	8435
Impressions	999,838
Average impressions per post	2431.0
Reach	602,557
Average reach per post	1930.0

Discussion

The purpose of this study was to gain insight into the global reach of social media in OMS by examining user engagement patterns of a single OMS-related Instagram account. Specifically, we aimed to characterize geolocation, languages spoken, age, gender, and engagement patterns of its followers. This study will help to characterize the distribution and demographics of the OMS workforce, trainees, and affiliates around the world. Briefly, we show that OMS-related social media accounts have substantial user engagement and have the potential to reach a considerable number of individuals globally.

As of 2020, there were over 3.6 billion social media users worldwide, with 2.7 billion, 1.4 billion, 330 million, and 260 million worldwide users of Facebook, Instagram, Twitter, and LinkedIn, respectively [4]. As our study demonstrates, the potential global reach of social media in OMS is seemingly limitless. In less than one year, this OMS-related Instagram account was able to amass nearly 10,000 followers, make almost 1,000,000 impressions, and reach over 600,000 unique individuals. Followers were located in cities and countries in every corner of the globe, spanning all six continents, and spoke over 45 different languages.

The field of OMS has grown substantially in recent decades — not only in the number of surgeons, but also in their

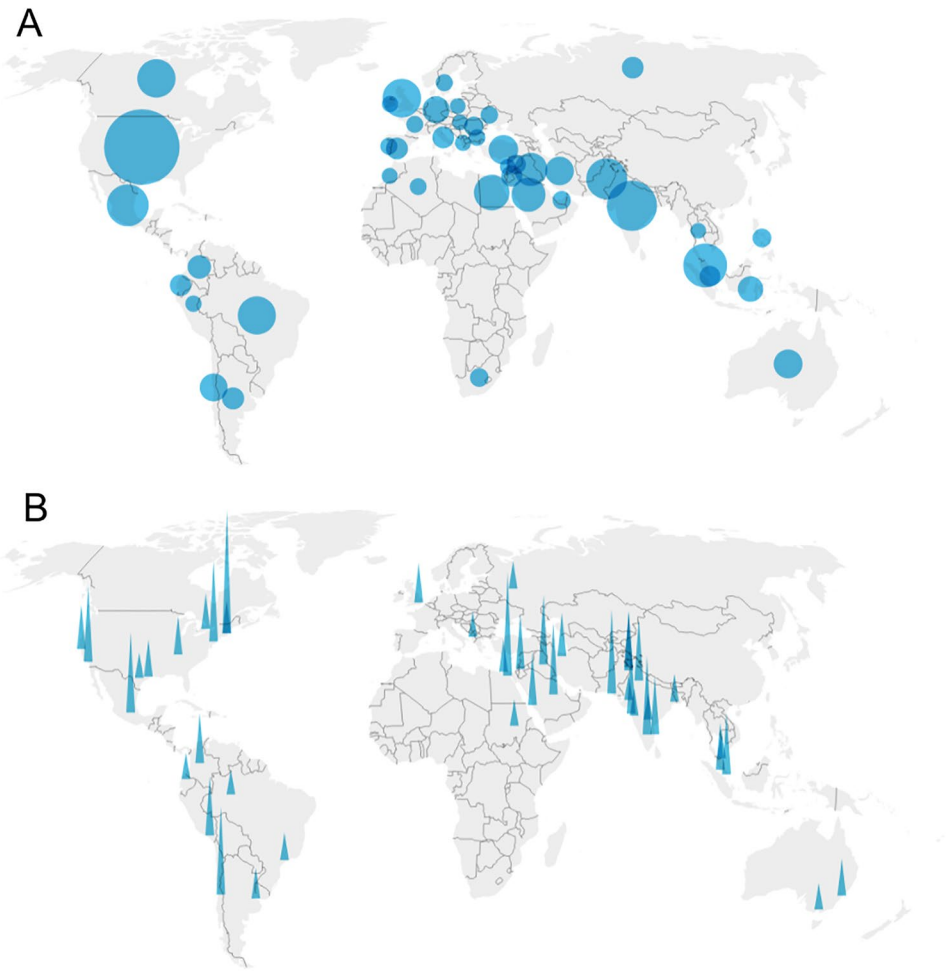

Fig. 1 **a** Geographic distribution of followers based on country. **b** Geographic distribution of followers based on city. Only the top 45 countries and cities are displayed

Table 2 Top 45 countries, cities, and languages of followers based on geolocation

Country	Value (%)	City	Value (%)	Language	Value (%)
USA	2001 (31.7)	New York, New York	163 (8.9)	English (USA)	4164 (59.6)
India	788 (12.5)	Boston, Massachusetts	94 (5.1)	English (UK)	955 (13.7)
Malaysia	331 (5.3)	Cairo, Cairo Governorate	79 (4.3)	Spanish (Latin America)	350 (5.0)
Mexico	250 (4.0)	Santiago, Santiago Metropolitan Region	67 (3.7)	Portuguese (Brazil)	166 (2.4)
Pakistan	225 (3.6)	Karachi, Sindh	64 (3.5)	English (India)	146 (2.1)
UK	215 (3.4)	Mexico City, Distrito Federal	61 (3.3)	Arabic (World)	123 (1.8)
Canada	189 (3.0)	Philadelphia, Pennsylvania	61 (3.3)	Turkish (Turkey)	119 (1.7)
Brazil	185 (2.9)	Bangalore, Karnataka	60 (3.3)	Spanish (Mexico)	117 (1.7)
Egypt	183 (2.9)	Los Angeles, California	58 (3.2)	French (France)	103 (1.5)
Saudi Arabia	158 (2.5)	Riyadh, Riyadh Region	54 (3.0)	German (Germany)	100 (1.4)
Iraq	142 (2.3)	Baghdad, Baghdad Governorate	53 (2.9)	Russian (Russia)	87 (1.3)
Turkey	134 (2.1)	Singapore, Singapore	47 (2.6)	Spanish (Spain)	60 (0.9)
Australia	103 (1.6)	Mumbai, Maharashtra	47 (2.6)	Italian (Italy)	48 (0.7)
Iran	98 (1.6)	Delhi, Delhi	47 (2.6)	Spanish (Chile)	47 (0.7)
Chile	96 (1.5)	Lahore, Punjab	45 (2.5)	Portuguese (Portugal)	26 (0.4)
Germany	91 (1.4)	Istanbul, Istanbul Province	45 (2.5)	Spanish (Colombia)	22 (0.3)
Indonesia	84 (1.3)	Chennai, Tamil Nadu	44 (2.4)	Romanian (Romania)	22 (0.3)
Colombia	74 (1.2)	Sialkot, Punjab	42 (2.3)	Indonesian (Indonesia)	22 (0.3)
Argentina	60 (1.0)	Amman, Amman Governorate	42 (2.3)	Swedish (Sweden)	21 (0.3)
Spain	53 (0.8)	Jeddah, Makkah Region	40 (2.2)	Spanish (USA)	21 (0.3)
Russia	51 (0.8)	Bogotá, Distrito Especial	38 (2.1)	Polish (Poland)	20 (0.3)
Italy	51 (0.8)	Kuala Lumpur, Kuala Lumpur	36 (2.0)	Greek (Greece)	18 (0.3)
Ecuador	51 (0.8)	Tehran, Tehran Province	33 (1.8)	Korean (South Korea)	18 (0.3)
Jordan	49 (0.8)	San Francisco, California	33 (1.8)	Vietnamese (Vietnam)	17 (0.2)
Singapore	48 (0.8)	London, England	30 (1.6)	Dutch (Netherlands)	16 (0.2)
Romania	45 (0.7)	Nashville, Tennessee	29 (1.6)	Norwegian Bokmål (Norway)	15 (0.2)
Syria	39 (0.6)	Sydney, New South Wales	28 (1.5)	Chinese (Taiwan)	14 (0.2)
Philippines	38 (0.6)	Houston, Texas	28 (1.5)	Persian (Iran)	13 (0.2)
South Africa	36 (0.6)	Toronto, Ontario	27 (1.5)	French (Canada)	13 (0.2)
United Arab Emirates	35 (0.6)	Alexandria, Alexandria Governorate	25 (1.4)	Hungarian (Hungary)	11 (0.2)
Ukraine	34 (0.5)	Brookline, Massachusetts	25 (1.4)	Finnish (Finland)	10 (0.1)
Portugal	31 (0.5)	Buenos Aires, Ciudad Autónoma de Buenos Aires	23 (1.3)	English (Canada)	10 (0.1)
Sweden	29 (0.5)	São Paulo, São Paulo (state)	21 (1.1)	Danish (Denmark)	10 (0.1)
Algeria	29 (0.5)	Kolkata, West Bengal	21 (1.1)	Japanese (Japan)	9 (0.1)
France	28 (0.4)	Kubang Kerian, Kelantan	21 (1.1)	Hebrew (Israel)	9 (0.1)
Bulgaria	28 (0.4)	Pune, Maharashtra	21 (1.1)	Arabic (Egypt)	8 (0.1)
Peru	27 (0.4)	Moscow, Moscow	21 (1.1)	Serbian (Serbia)	8 (0.1)
Ireland	26 (0.4)	Melbourne, Victoria	20 (1.1)	Czech (Czech Republic)	7 (0.1)
Morocco	26 (0.4)	Quito, Pichincha Province	20 (1.1)	Ukrainian (Ukraine)	7 (0.1)
Albania	25 (0.4)	Khartoum, Khartoum	20 (1.1)	Croatian (Croatia)	6 (0.1)
Lebanon	25 (0.4)	Hyderabad, Telangana	20 (1.1)	Chinese (China)	6 (0.1)
Poland	24 (0.4)	Ahmedabad, Gujarat	19 (1.0)	Dutch (Belgium)	6 (0.1)
Thailand	23 (0.4)	Lima, Lima Region	19 (1.0)	Slovak (Slovakia)	5 (0.1)
Hungary	23 (0.4)	San Antonio, Texas	19 (1.0)	English (Pakistan)	5 (0.1)
Sudan	23 (0.4)	Tirana, Tirana County	19 (1.0)	Thai (Thailand)	4 (0.1)

The distribution of countries and cities is based on each follower's geolocation. Private Instagram accounts are not taken into consideration. Only the top 45 countries, cities, and languages are displayed

geographic dispersion across the world. As such, the profession must no longer rely on traditional means of dispersing surgical knowledge, such as through in-person conferences, lectures, and presentations. This is exceedingly relevant in light of the COVID-19 pandemic, as it has become even more critical to utilize digital platforms that are inclusive and convenient for users. OMSs must begin to effectively utilize accessible social media platforms to facilitate the global dissemination, and bilateral exchange, of surgical practices and techniques. For example, low-income (LIC) and low-middle-income countries (LMIC) have traditionally lacked adequate access to accessible OMS services, but they also have some of the fastest growing digital markets in the world [5]. This landscape allows for a unique opportunity to cultivate global partnerships through social media, which can also facilitate expanded capacity building efforts and allow for the mutual exchange of surgical knowledge and expertise.

There are numerous limitations to this study, all of which warrant further consideration. First, the results of this study are derived from a single OMS-related Instagram account and may not necessarily be representative of user engagement patterns of all OMS-related social media platforms. Therefore, future studies should attempt to collate data on user engagement patterns from multiple social media accounts to enhance the generalizability of the findings. Second, social media platforms such as Facebook, Twitter, and Instagram utilize filter bubbles, which are algorithms that predict information that a user would like to see based on a user's location, search history, and past behavior. As the OMS-related Instagram account is based in the USA and all content is published in English, there may be geographic and linguistic bias in the followers identified in this study.

In conclusion, OMS-related social media has the potential to facilitate global collaboration and augment the dissemination of surgical knowledge and expertise.

Acknowledgements Global Surgery Student Alliance (GSSA), Boston, MA, USA

Declarations

Ethics approval and consent to participate This study was granted exemption status by the Boston Children's Hospital (BCH) Institutional Review Board (IRB-P00040508). Obtaining consent to participate is not applicable for this study as these data were anonymous.

Consent for publication Obtaining consent to publish is not applicable for this study as these data were anonymous.

Competing interests The authors declare no competing interests.

References

1. Vervoort D, Luc JG (2020) Hashtag global surgery: the role of social media in advancing the field of global surgery. Cureus 12:e8468
2. Yang SC, Kwon WM, Saghezchi S (2021) An update on Instagram utilization by oral and maxillofacial surgery residency programs: the social media big bang. J Oral Maxillofac Surg 79:1394–1395
3. Rekawek P, Gallagher B, Wu B, Karlis V (2021) Oral and maxillofacial surgery journals' presence on social media: an adaptation to enhance publication readership and interdisciplinary collaboration? J Oral Maxillofac Surg 79:1991–1993
4. Number of Social Network Users Worldwide from 2017 to 2025. In: Statista. https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/. Accessed 8 Dec 2021
5. Meara JG, Leather AJM, Hagander L et al (2016) Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. Int J Obstet Anesth 25:75–78