

RESEARCH LETTER

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Analysis of top influencers in critical care medicine “twitterverse” in the COVID-19 era: a descriptive study

Ronny Munoz-Acuna^{1*} , Akiva Leibowitz¹ , Margaret Hayes²  and Somnath Bose¹ 

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Dear Editor:

Twitter, a microblogging platform, has become increasingly popular within the medical community as it facilitates prompt dissemination of information among users within and across specialties [1–3]. With a worldwide subscriber base of over 190 million, Twitter’s reach is broad and its impact substantial. Since the onset of the COVID-19 pandemic, the quantity of medical information shared through the platform has grown exponentially. Unfortunately, the veracity of the content disseminated is frequently unclear. Besides, the brevity of the information limits the ability to convey and interpret complex ideas, promoting valid and invalid *ad hominem* arguments as substantial forces in propagating ideas. Furthermore, misinformation spread through social media can lead to harm [4]. Therefore, it is essential to identify the main actors in the field since the top influencers are not necessarily experts in this area.

We aimed to characterize the demographics, academic credentials and research productivity of the top 250 critical care medicine influencers on Twitter as identified by proprietary software, Cronycle (London, UK) which uses a proprietary algorithm to calculate an influencer score based on engagement (which includes features such as

retweets, likes and views) to determine the “influence” of a Twitter account within a topic of discussion [5]. This was performed on March 30, 2021, taking into consideration the following time period March 30, 2020–March 30, 2021, which coincided with the first wave of the ongoing pandemic. A network graph was created using NodeXL (Social Media Research Foundation, CA, USA) utilizing the last 1000 tweets of each account and establishing a visual relationship between the different accounts as shown in Fig. 1 [6]. To retrieve each influencer’s information, we looked at Twitter pages, Doximity accounts, LinkedIn profiles and institutional webpages. The h-index was obtained using the Scopus Preview Website.

Among the top 50 influencers, only 28% ($n=14$) had formal training in Critical Care Medicine (CCM). 84% ($n=42$) of the top influencers were male. Emergency medicine was the most common specialty ($n=35$, 70%), followed by anesthesia ($n=4$, 8%), pulmonary critical care medicine ($n=2$, 4%), internal medicine ($n=2$, 4%), surgery ($n=1$, 2%), pediatrics ($n=1$, 2%). Most influencers ($n=31$, 62%) held academic titles.

Further, we compared the demographic and academic credentials of the top 50 influencers with those in the lowest quintile (rank 201–250). The top influencers had a higher median influencer score 87 (IQR: 86, 89) vs. 75 (IQR: 74, 76) ($p<0.01$) and higher number of followers 15,118 (IQR: 10,031, 27,543) vs. 3699 (IQR: 2443, 6688) ($p<0.01$) when compared to the lowest quintile. Top influencers were more likely to work in academic settings ($p=0.006$) when compared to those in the bottom 50. There was no statistically significant difference

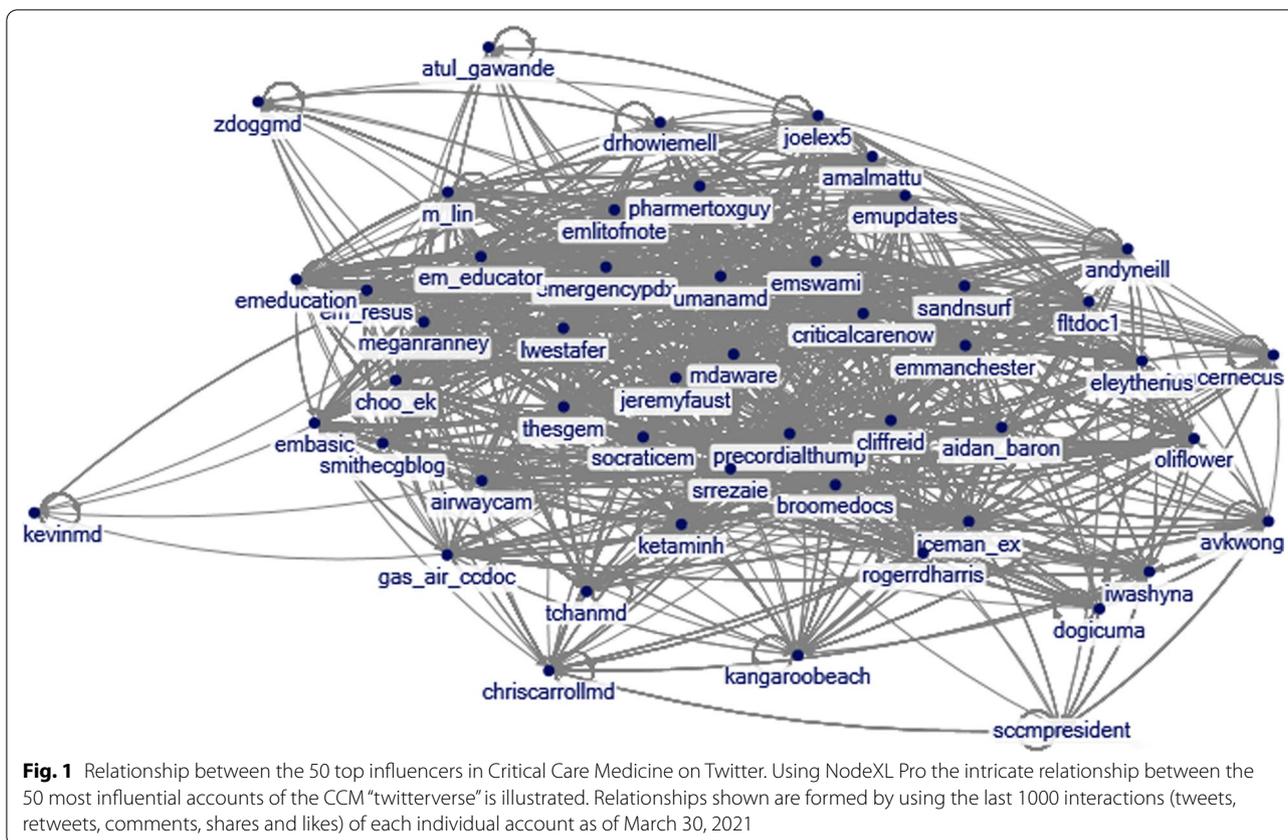
*Correspondence: rmunoz@bidmc.harvard.edu

¹ Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, 330 Brookline Avenue, Boston, MA 02215, USA

Full list of author information is available at the end of the article



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between h-indices ($p=0.902$), number of publications ($p=0.935$), number of citations ($p=0.946$) or formal CCM training ($p=0.96$) between the group of influencers.

Our descriptive study demonstrates that the CCM “twitterverse” is dominated by male US-based academic physicians mostly without fellowship training in CCM and modest scholarly productivity evidenced by publication, citations and h-indices (Table 1). Emergency medicine was the most predominant specialty represented among the top influencers. Limitations of using a proprietary software notwithstanding, our results indicate

that the reach of influencers remains significant and is not correlated with academic productivity. Our limited sample does not allow us to draw overarching conclusions and should be considered exploratory; it is essential to consider that the veracity of the disseminated information may not necessarily correlate with the academic credentials or productivity and that the associations noted are highlighted solely for descriptive purposes. Further investigation in this area should focus on development of mechanisms categorizing tweets by their scientific content and validity.

Table 1 Characteristics of top 50 influencers and lower 50 influencers

Characteristic	Top 50 Influencers (Rank 1–50) N (%)	Lower 50 Influencers (Rank 201–250) N (%)	P value
Account characteristics			
Topic score	87 (IQR: 86–89)	75 (IQR: 74–76)	$p < 0.01$
Following	1082 (IQR: 315–2757)	1160 (IQR: 495–2163)	$p = 0.694$
Followers	15,118 (IQR: 10,031–27,543)	3699 (IQR: 2443–6688)	$p < 0.01$
Gender			
Male	42 (84%)	43 (86%)	$p = 1.0$
Academic indexes			
H-index	8 (IQR: 3–21)	8 (IQR: 3–16)	$p = 0.902$
Publications	26 (IQR: 6–72)	27 (IQR: 6–590)	$p = 0.935$
Citations	222 (IQR: 83–1910)	234 (IQR: 71–2666)	$p = 0.946$
Graduation year			
Medical school	2002 (IQR: 1995–2005)	2001 (IQR: 1998–2008)	$p = 0.591$
Residency	2005 (IQR: 2000–2011)	2004 (IQR: 2001–2011)	$p = 0.725$
Fellowship	2012 (IQR: 2008–2017)	2009 (IQR: 2002–2013)	$p = 0.129$
Location			
USA	30 (60%)	28 (56%)	$p = 0.176$
Other	20 (40%)	22 (44%)	
Practice setting			
Academic	44 (88%)	38 (76%)	$p = 0.006$
Community	6 (12%)	8 (16%)	
Private		4 (8%)	
Faculty position			
Professor	13 (26%)	10 (20%)	$p = 0.445$
Associate professor	5 (10%)	6 (12%)	
Assistant professor	11 (22%)	4 (14%)	
Instructor	2 (4%)		
In-training	2 (4%)	3 (6%)	
CCM fellowship	14 (28%)	23 (46%)	$p = 0.96$

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Authors' contributions

RM conceptualized and designed the study and acquired the data. RM and SB analyzed the data and drafted the manuscript. The manuscript is revised critically for the important intellectual content: All authors read and approved the final manuscript.

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Availability of data and materials

Data will be made available upon reasonable request to researchers who provide a methodologically sound proposal, after approval by the study authors and with a signed data access agreement. Questions about data are handled by the corresponding author.

Declarations**Ethics approval and consent to participate**

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, 330 Brookline Avenue, Boston, MA 02215, USA. ²Division of Pulmonary, Critical Care, and Sleep Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA.

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