



Age-related differences in social media use in the neurosurgical community: A multi-institutional study



Methma Udawatta^{a,g}, Edwin Ng^a, H. Westley Phillips^a, Jia-Shu Chen^a, Bayard Wilson^a,
Giyarpuram N. Prashant^a, Daniel T. Nagasawa^a, Isaac Yang^{a,b,c,d,e,f,g,*}

^a Departments of Neurosurgery, Los Angeles (UCLA), Los Angeles, CA, United States

^b Departments of Radiation Oncology, Los Angeles (UCLA), Los Angeles, CA, United States

^c Departments of Head and Neck Surgery, Los Angeles (UCLA), Los Angeles, CA, United States

^d Departments of Jonsson Comprehensive Cancer Center, Los Angeles (UCLA), Los Angeles, CA, United States

^e Departments of Los Angeles Biomedical Research Institute, Los Angeles (UCLA), Los Angeles, CA, United States

^f Departments of Harbor-UCLA Medical Center, Los Angeles (UCLA), Los Angeles, CA, United States

^g Departments of David Geffen School of Medicine of the University of California, Los Angeles (UCLA), Los Angeles, CA, United States

ARTICLE INFO

Keywords:

Neurosurgery
Outreach
Social media

ABSTRACT

Objectives: Social media is evolving and growing at an exponential rate today. From a healthcare perspective, these platforms can be used to enhance professional networking, education, organizational promotion, patient care, patient education, and public health programs without the limitations of geographic and time-related access barriers. Given the possible importance of social media in medicine, and the conflicting reports in literature about its use in healthcare, it is important to identify its utility within the neurosurgical community. We set out to measure the use of social media platforms among neurosurgery faculty, fellows, and residents.

Patients and methods: An online survey using the SurveyMonkey platform was sent to the program directors of 102 accredited neurosurgery programs across the United States. Program directors then distributed these surveys to the residents, fellows, and attendings at their respective institutions once each month between October 2017 and December 2017. Neurosurgeons participated anonymously, voluntarily, and received no compensation for their participation. Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 25 (IBM SPSS Statistics for Windows, IBM Corporation, Armonk, NY).

Results: 137 attendings, 96 residents, and 8 fellows responded to the survey (81% male). Most (70%) stated that they used social media for professional purposes. Sixty percent of all respondents believed that social media can be beneficial in terms of professional development. Younger neurosurgeons in training were more likely to read journal articles found via social media and were more likely to believe social media could be beneficial than older neurosurgeons at later stages in their career.

Conclusions: Results point toward differences in social media use based on age or level of training. Further studies should include a larger sample cohort over a longer time period to determine whether these trends will change over time.

1. Introduction

Today, social media is evolving and growing at an exponential rate, with platforms creating a common potential for people to establish online communities where they can share and exchange information. Social media includes social networking platforms such as Facebook, Instagram, Snapchat, Twitter, Blogger, YouTube, forums, wikis, or LinkedIn. Participation in social media by the general public has

significantly increased over the past nine years given its popularity and ubiquity [1] and the universal nature of social media makes it the ideal medium to disseminate information and administrate reforms on a larger scale.

From a healthcare perspective, these online communities can be used to enhance professional networking, education, organizational promotion, patient care, patient education, and public health programs without the limitations of geographic and time-related access barriers.

* Corresponding author at: Department of Neurosurgery, University of California, Los Angeles 300 Stein Plaza, Ste. 562, Los Angeles, CA, 90095-1761, United States.

E-mail address: iyang@mednet.ucla.edu (I. Yang).

<https://doi.org/10.1016/j.clineuro.2019.03.027>

Received 26 February 2019; Received in revised form 21 March 2019; Accepted 30 March 2019

Available online 01 April 2019

0303-8467/ © 2019 Published by Elsevier B.V.

[2–4] In the United States, 80% of those who use the Internet use it to search for health information, with almost three quarters of these individuals using social media [5]. Social media can be leveraged to expand and improve knowledge exchange, networking, professional development, health promotion, dissemination of updates in standard medical practices, promote health systems, and provide employment or research opportunities in the medical field. By enabling a vast and increased network, social media is benefiting the field. Social media platforms also allow healthcare providers to share and exchange different challenges and outcomes to better patient care.

Since 2005, the proportion of adults using social media in the U.S. has increased from 8% to 72% [1,6]. Like the general population, surgeons have adapted to new technologies such as using social media for their personal activities; however, professional use of social media varies between specialties. A survey conducted on the surgical faculty, fellows, and residents at four academic medical centers in 2016 indicated that of 208 surgeons, 46 (22%) indicated that they preferred some form of social media as a means of networking and communication [7]. In this survey, 145 (70%) indicated that they believed social media bolsters professional development [7]. Furthermore, a recent review on the usage of social media in medical education determined that interventions using social media resulted in improvements in knowledge, and skills among students and residents [8–10].

On the contrary, according to a study conducted on 4000 physicians, only 65% of the physicians used social media sites for professional purposes while above 90% used social media for recreation, suggesting that social media is not vastly being used for professional purposes. [11,12] An American College of Surgeons survey supported this finding by demonstrating that 55% of respondents used Facebook, 48% used LinkedIn, and 82% viewed videos on YouTube for personal use [13]. Given the importance of social media in medicine, and the conflicting reports in literature about its use in healthcare, it is important to identify its utility within the neurosurgical community. In order to measure the use of social media platforms in neurosurgery faculty, fellows, and residents, we surveyed at all 102 U.S. neurosurgery training programs.

2. Patients and methods

2.1. Survey distribution and responses

An online survey using the SurveyMonkey platform was sent to the program directors of 102 accredited neurosurgery programs across the United States. Program directors then distributed these surveys to the residents, fellows, and attendings at their respective institutions once each month between October 2017 and December 2017. Neurosurgeons participated anonymously, voluntarily, and received no compensation for their participation. Survey data were collected four months after the surveys were sent to the study participants. This study did not require approval from the institutional review board.

2.2. Statistical analysis

Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 25 (IBM SPSS Statistics for Windows, IBM Corporation, Armonk, NY). A chi-square test of independence was used to test for significance between different demographic variables. In the case of the three age groups, if results were significant, multiple pairwise comparisons were performed to determine and differences between two groups, with a Bonferroni correction to maintain an alpha level of .05.

3. Results

A total of 241 neurosurgeons responded to the surveys (96 attendings, 8 fellows, and 137 residents) (Table 1). Fellows were grouped with

Table 1
Demographics of survey respondents.

Level of Training	Respondents, n (%)
Resident	137 (56.8%)
Fellow	8 (3.3%)
Attending	96 (39.8%)
Sex	
Male	195 (80.9%)
Female	46 (19.1%)
Age Range	
25-34	136 (56.4%)
35-44	46 (19.1%)
45-54	29 (12.0%)
55-64	17 (7.1%)
65-74	8 (3.3%)
75+	5 (2.1%)
Social Media Used for Professional Purposes	
LinkedIn	115 (47.7%)
Doximity	113 (46.9%)
Facebook	45 (18.7%)
Twitter	38 (15.8%)
Instagram	18 (7.5%)
No Accounts	71 (29.5%)

attendings for data analysis due to a small sample size. Of those who responded, 81% identified as male; in sum, 56% of respondents were under the age of 34 and 13% were over the age of 55 (Table 1). Conferences were the preferred method of networking for most (82%) of respondents, as was email (55% of respondents) (Table 1). A large majority (70%) of those who answered the survey also stated that they used social media for professional purposes (Table 1). Residents were significantly more likely to use LinkedIn professionally than fellows and attendings, $\chi^2 (1, N = 241) = 5.045, p = .025$.

Sixty percent of all respondents believed that social media can be beneficial in terms of professional development. We analyzed the results by grouping respondents into three pools by age: 25–34, 35–55, and over 55 years old. There was a significant difference between the three age groups and their attitudes towards the benefits of social media, $\chi^2 (4, N = 240) = 15.717, p = .003$. In general, the younger age group holds more favorable ratings on the benefits of social media compared to older age groups. To compare between individual age groups, individual pairwise comparisons were performed with a Bonferroni correction to maintain an alpha level of .05. Comparing respondents aged 25–34 with respondents over 55, the younger age group was significantly more likely to answer “slightly beneficial” or “highly beneficial” to this survey question, $p < .001$, and the older age group significantly favored a more neutral view towards social media, $p < .001$ (Table 2).

Sixty-one percent of respondents have read a journal article introduced to them by social media, and a significant difference was found between the age groups, $\chi^2 (2, N = 242) = 15.689, p < .001$. A general negative trend was observed between the age groups and the likelihood of reading a journal article through social media. Respondents in the 25–34 age group were significantly more likely to read articles from social media compared to respondents over the age of 75, $\chi^2 (1, N = 167) = 15.286, p < .0001$ (Table 3). Residents were

Table 2
Pairwise comparisons between age groups of whether social media was beneficial.

Age groups being compared	P-value
25-34 age group and 35-55 age group	0.122
35-54 age group and 55+ age group	0.09
25-34 age group and 55+ age group	< 0.001*

* P-value must be < .016 to be significant (Bonferroni correction).

Table 3

Pairwise comparisons between age groups of whether respondents have read a journal article introduced to them by social media.

Age groups being compared	P-value
25-34 age group and 35-55 age group	0.067
35-54 age group and 55+ age group	0.019
25-34 age group and 55+ age group	< 0.0001*

* P-value must be < .016 to be significant (Bonferroni correction).

also significantly more likely to read articles through social media compared to fellows and attendings, χ^2 (1, N = 240) = 4.187, $p = .041$. No significant trends were observed when comparing data across genders.

Thirteen percent of respondents have collaborated with a colleague known only through social media, and 17% of respondents regularly interact with patients or non-medical professionals through social media. For respondents refraining from social media, lack of time and perceived value, privacy concerns, and a preference for traditional methods of communication were noted to be equally important factors. No significant differences were observed across any demographic variables for these survey questions.

4. Discussion

The use of social media worldwide is undoubtedly increasing, as is its use in healthcare specifically [14]. Social media is being used for a variety of healthcare purposes and can be broadly categorized into the following realms: support, education, disease modification, disease diagnosis, and disease management [15]. Neurosurgical departments around the country are using a variety of social media accounts including Facebook, Twitter, and YouTube to reach their respective communities [16]. Therefore, we sought to determine how neurosurgeons across the country use social media for professional purposes, which accounts they use, whether they were beneficial for professional development, and how the accounts were used in the context of medicine.

When responses to our survey were stratified by age, we found that younger respondents were more likely to report that social media was “slightly beneficial” or “highly beneficial” in terms of their professional development as compared to older respondents. Similarly, Alotaibi et al. showed that most social media users were in our “younger” age range; interestingly, Facebook posts demonstrated higher social media metrics “if they mentioned faculty with more than 16 years of experience” [17]. To place our results in the midst of existing literature: Wang et al reported that on a grander scheme, journals with social media accounts had higher Altmetric scores (a database with weighted total scores of all online mentions for any one journal article) than those without social media accounts. This suggests that journals using social media can reach a larger group of people on the internet [18]. Alotaibi et al. showed that the presence of a social media account for an academic neurosurgery department was associated with higher values of academic impact metrics [19]. Additionally, other studies have shown how social media has been used to provide medical information to patients as well as maintaining platforms for patient support groups [15,20–22]. However, with this increased social media use (on both sides – by researchers and healthcare professionals as well as patients alike), some worry about the spread of false information, both in terms of medicine and provider ratings [23]. Luckily, Donnally et al. found that although spine surgeons with a social media presence had more ratings and comments on online physician rating systems (Healthgrades.com, Vitals.com, and Google.com), their scores were not correlated with social media presence [24]. Overall, this suggests that social media seems to be positively impacting the outreach and engagement of hospitals, individual surgeons, and patients alike.

Additionally, our data showed that younger users were more likely to read articles on social media than older neurosurgeons. This is in accord with a recent paper detailing how the Journal of Neurointerventional Surgery began a campaign to expand their social media presence and found that their engagement increased significantly as a result [25]. Changes in how the internet is used, how science is disseminated, and how academic productivity is measured have all contributed to the unique relationship between the internet and medicine [26]. Social media seems to sit with a hand in both, bridging the space between medical professionals and literature or between healthcare providers and patients, so that all are accessible at the touch of one’s fingertips, within seconds.

4.1. Limitations

This study has several limitations. First, the small sample size makes it difficult to generalize outcomes to the larger population of neurosurgeons, as does limiting the survey respondent population to only those at academic teaching hospitals. Surveys introduce a self-reporting selection bias which may introduce a skewed population. The survey itself was spread via email and the SurveyMonkey platform which could have excluded certain populations of neurosurgeons. Secondly, the age and training clearly have a very strong correlation, which could be a confounding variable for our conclusions. The changing attitudes towards and usage of social media with age could be due to increased time constraints as a neurosurgeon’s career progresses or increased venues in which one could be exposed to journal articles, for example. Finally, voluntary response bias could have occurred as individuals who chose to respond to the survey were self-selected and may have had stronger opinions on social media than those who chose not to respond.

5. Conclusions

Our study sought to determine whether there were differences in how neurosurgeons of different ages and stages of training use social media for professional purposes, which entities they use, and how they use these outlets. As such, our data showed that younger neurosurgeons in training were more likely to read journal articles found via social media and were more likely to believe social media could be beneficial than older neurosurgeons at later stages in their career. As social media’s use continues to expand into the realm of healthcare, these attitudes should be followed to determine whether there is a shift in how social media is viewed and utilized in the sphere of neurosurgery.

Conflict of interest

The authors report no conflicts of interest concerning the materials or methods used in this study or the findings specified in this paper.

Disclosure of funding

Methma Udawatta is supported by the David Geffen Medical Scholarship. Isaac Yang is supported by the UCLA Visionary Ball Fund Grant, Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research UCLA Scholars in Translational Medicine Program Award, Jason Dessel Memorial Seed Grant, UCLA Honberger Endowment Brain Tumor Research Seed Grant, Stryker Research Award, and Stop Cancer (US) Research Career Development Award.

References

- [1] M. von Muhlen, Reviewing social media use by clinicians, *J. Am. Med. Inform. Assoc.* 19 (2012) 777–781.
- [2] C.L. Ventola, Social media and health care professionals: benefits, risks, and best practices, *P T* 39 (7) (2014) 491–520.
- [3] H. Alsobayel, Use of social media for professional development by health care professionals: a cross-sectional web-based survey, *JMIR Med. Educ.* 2 (2) (2016)

- e15.
- [4] S.J. Langenfeld, D.J. Vargo, P.J. Schenarts, Balancing privacy and professionalism: a survey of general surgery program directors on social media and surgical education, *J. Surg. Educ.* 73 (6) (2016) e28–e32.
- [5] E.E. Zusman, Social media in academic neurosurgery, *World Neurosurg.* 91 (2016) 606–608.
- [6] J.M. Bernhardt, J. Alber, R.S. Gold, A social media primer for professionals: digital dos and don'ts, *Health Promot. Pract.* 15 (2) (2014) 168–172.
- [7] J.P. Wagner, A.L. Cochran, C. Jones, N.J. Gusani, T.K. Varghese Jr., D.J. Attai, Professional use of social media among surgeons: results of a multi-institutional study, *J. Surg. Educ.* 75 (3) (2018) 804–810.
- [8] C.C. Cheston, T.E. Flickinger, M.S. Chisolm, Social media use in medical education: a systematic review, *Acad. Med.* 88 (6) (2013) 893–901.
- [9] D.R. George, C. Dellasega, Use of social media in graduate-level medical humanities education: two pilot studies from Penn State College of Medicine, *Med. Teach.* 33 (8) (2011) e429–434.
- [10] L.C. Lamb, M.M. DiFiori, V. Jayaraman, B.D. Shames, J.M. Feeney, Gamified twitter microblogging to support resident preparation for the American board of surgery in-service training examination, *J. Surg. Educ.* 74 (6) (2017) 986–991.
- [11] M. Househ, The use of social media in healthcare: organizational, clinical, and patient perspectives, *Stud. Health Technol. Inform.* 183 (2013) 244–248.
- [12] N.S. Fogelson, Z.A. Rubin, K.A. Ault, Beyond likes and tweets: an in-depth look at the physician social media landscape, *Clin. Obstet. Gynecol.* 56 (3) (2013) 495–508.
- [13] S.Z. Yamout, Z.A. Glick, D.S. Lind, R.A. Monson, P.L. Glick, Using social media to enhance surgeon and patient education and communication, *Bull. Am. Coll. Surg.* 96 (7) (2011) 7–15.
- [14] C. Hawn, Take two aspirin and tweet me in the morning: how twitter, facebook, and other social media are reshaping health care, *Health Aff. (Millwood)* 28 (2) (2009) 361–368.
- [15] R. Patel, T. Chang, S.R. Greysen, V. Chopra, Social media use in chronic disease: a systematic review and novel taxonomy, *Am. J. Med.* 128 (12) (2019) 1335–1350.
- [16] N.M. Alotaibi, J.H. Badhiwala, F. Nassiri, et al., The current use of social media in neurosurgery, *World Neurosurg.* 88 (2016) 619–624 e617.
- [17] N.M. Alotaibi, N. Samuel, D. Guha, et al., Social media for academic neurosurgical programs: the university of Toronto experience, *World Neurosurg.* 93 (2016) 449–457.
- [18] J. Wang, N.M. Alotaibi, G.M. Ibrahim, A.V. Kulkarni, A.M. Lozano, The spectrum of altmetrics in neurosurgery: the top 100 "trending" articles in neurosurgical journals, *World Neurosurg.* 103 (2017) 883–895 e881.
- [19] N.M. Alotaibi, D. Guha, A. Fallah, et al., Social media metrics and bibliometric profiles of neurosurgical departments and journals: is there a relationship? *World Neurosurg.* 90 (2016) 574–579 e577.
- [20] N.M. Alotaibi, N. Samuel, J. Wang, et al., The use of social media communications in brain aneurysms and subarachnoid hemorrhage: a mixed-method analysis, *World Neurosurg.* 98 (2017) 456–462.
- [21] N. Samuel, N.M. Alotaibi, A.M. Lozano, YouTube as a source of information on neurosurgery, *World Neurosurg.* 105 (2017) (2017) 394–398.
- [22] E.J. Wild, J.B. Carroll, HDBuzz: empowering patients through accessible education, *Trends Mol. Med.* 18 (1) (2012) 1–3 2012.
- [23] P.D. Delgado-Lopez, E.M. Corrales-Garcia, Influence of internet and social media in the promotion of alternative oncology, cancer quackery, and the predatory publishing phenomenon, *Cureus* 10 (5) (2018) e2617 2018.
- [24] C.J. Donnelly 3rd, D.J. Li, J.A. Maguire Jr. et al., How social media, training, and demographics influence online reviews across three leading review websites for spine surgeons, *Spine J.* (2018).
- [25] K.M. Fargen, T.A. Wilson, R. de Leacy, A.P. Jadhav, A.F. Ducruet, Social media and JNIS: expanding the digital clique, *J. Neurointerv. Surg.* 9 (10) (2017) 913–914 2017.
- [26] V.C. Prabhu, K. Swong, G. Hendler, Publication metrics in neurosurgery, *World Neurosurg.* 105 (2017) 993–996.