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Short Communication

The Kardashian index of cardiologists: Do more social media followers mean more citations or merely celebrity status in academia?

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Social media continues to permeate through the various factions of the academic fraternity, significantly impacting the research outreach. Of these factions, cardiologists are no exceptions. In recent times, there has been mounting fervor regarding the various parameters that can be employed to ascertain a researcher's prolificacy. One of these, termed the Kardashian Index, was inspired by Kim Kardashian, an influential figure with millions of followers across various social media platforms. Although her celebrity status bears no relevance to scientific academia, her popularity has inspired a new index for the dissemination of research. In recent times, scientists, researchers, and clinicians alike have resorted to social media for the proliferation and dissemination of their research. Sharing across social media platforms subsequently increases the likelihood that a research might be cited, thus prompting clinicians to wonder whether a correlation truly exists between a researchers' social media presence and their amassed citations.

The Kardashian index (K-index) was proposed in 2014 in an article by Neil Hall to simply study a link between the number of followers a physician or scientist has on Twitter and the number of citations on their scientific publications [1]. It is undeniable that social media has consumed the general populace's daily lives; however, unrestricted access has also made it easier to disseminate meaningful information pertaining to scientific literacy. Within the scientific community, it has played a very pertinent role in broadcasting medical research to millions of people worldwide. Imperatively, these aforesaid parameters have paved the way for experts in cardiology to amass their digital influence by not only making their work easily accessible to the public online but also through engagement with their colleagues, students, and even patients via Twitter and other social media platforms [2].

The notion underlying the K-index pivots around the fact that fame is evaluated by the number of followers and more followers generate added success, which, in turn, begets more fame. This newfound fame can thus increase a cardiologist's research transparency, thereby increasing the likelihood of garnering additional citations on published research. However, does the same formula apply to cardiologists and other medical experts as we see a rise in public figures on social media from the academic world? In academic fraternity, "success" is largely gauged by the number of citations and its relationship with Twitter following, whereby a scientist with a K-Index of more than 5 is proclaimed by the authors to be the "Kardashian of Science" [1]. However, when it was put to test in 2014 in the same article, the number of "Kardashians" was remarkably low, with a predominance of males, and the analysis showed conspicuous inconsistency between social media influence and the number of citations [1]. A low K-Index, for instance, could insinuate that a reputed scientist recently joined Twitter, or perhaps does not use twitter at all. Equally, it could also imply that the researcher in question is perhaps not active enough on the platform to propagate an audience big enough to reach a "Kardashian" status.

Furthermore, in 2020, an analysis in an article by Khan MS et al., corroborated the same inconsistency, whereby out of the 1500 cardiologists chosen randomly from the top 100 cardiology hospitals, only 238 had a Twitter handle and most of them had a low K-Index [3]. It is also interesting to note that the small group of "Kardashians" is mostly interventional cardiologists, which can be attributed in part or in whole to the mounting interest that the newer generation fosters for this subspecialty [3]. This could potentially explain the skew towards the soaring K-indices within the interventional cardiology fraternity [4]. The pivotal perspective is that the most renowned experts in cardiology do not maintain a social media presence despite its increasing popularity and yet this absence has not discredited their work in any way or put them at a disadvantage compared to cardiologists on social media. This

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goes to show that the number of followers is not the ultimate driving force towards garnering additional citations and multiple factors determine a scientist's accomplishments, of which a high K-index might be an inconsequential component. The K-index therefore does not stand out to be a reliable measure of a physician's scientific worth.

Nevertheless, the fact that articles shared from a Twitter account that is more active with an exorbitant following will garner more attention in the form of likes, comments, and retweets cannot be discounted. Sharing and retweeting of an article can garner more readers, initiate scientific discussions, form professional connections, and even bolster a journal's impact factor through increased citations [5]. However, the data corroborating the ostensible link between a researcher's K-index and the citations amassed is exceedingly sparse. Given that a plethora of researchers refrains from using Twitter, Facebook, or any social media at all, the K-index cannot be reliably counted upon to ascertain a researcher's true scientific impact. Nevertheless, this pattern may change in the future as the newer generation of prodigies in medicine, who essentially grew up with social media and use it to stay apace with the latest research, seek mentors, and share their work in the hopes of getting recognition by their idols.

This is evident by looking at the literature available in recent time as presented in Table 1. Two conclusions are conspicuous. First, not many cardiologists are on twitter and secondly there is very little literature available analyzing the K-Index (which takes into account twitter followers and number of citations) and this might also be because of the general lack of presence of cardiology researchers on twitter. We further propose correlating and comparing the K-Index with the H-index. On paper, the K-Index makes sense; however, only in the long run with more cardiology researchers becoming active twitter users would we be able to put the K-Index to good use.

We further perused Researchgate to sift for the top 25 cardiologists from ResearchGate. Out of the 25, only three of them had even possessed a K-Index, which reinforces the lack of K-Index use among cardiology researchers. These results are tabulated in Table 2 below.

Indeed, the select group of "Twitteratis" with remarkably high K-indices is only a minutiae of those that produce meaningful research that continues to transform the research landscape. In this context, only time will tell if we see a wave of experts in cardiology online or merely social media influencers in the future.

Table 1
A tabulation of results from different articles correlating the number of citations and the K-index of various cardiologists.

Papers	Year	No of Cardiologist Included	No of Cardiologist with Twitter	No with a K-Index
A Kalra et al. [6]	2021	1500	245	199
Khan et al. [3]	2020	1500	238	238
S Hudson et al. [7]	2018	301	301	–

Table 2
An elucidation of the top 25 researchers based on citations and their respective K-indices.

Cardiologist	Publication	Citation	Twitter Following	K-Index
Heinrich Bechtold	57	1094	–	–
Roberto Mantovan	89	2835	–	–
Stephen E. Bash	9	155	–	–
Christine Henry	55	377	24	0.062
Kanha Vijay Singru	1	16	–	–
Amine Sehili	21	281	–	–
M.V. Papavasileiou	34	78	–	–
Sathish sumar Parasuraman	27	124	–	–
Javier Castañeda-López	7	6	–	–
Enzo Hrovatin	17	140	–	–
Pietro Zonzin	118	3060	–	–
Paolo China	9	69	–	–
Pierfranco Terrosu	29	495	–	–
Stefano Urbinati	150	1356	–	–
Edoardo Conte	206	2085	–	–
Alessio Ravani	44	725	–	–
Fabrizio Veglia	469	22301	–	–
Benedetta Porro	56	719	–	–
Gaetano Michele Fassini	118	2268	–	–
Mauro Amato	141	2472	–	–
Maura Brioschi	69	1214	–	–
Laura Fusini	171	1809	42	0.085
Andrea Daniele Annoni	132	1622	–	–
Silvia S Barbieri	81	1448	–	–
Hafiz Hussein	12	35	190	1.317

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TA, MF, VRN: conceived the idea, designed the study, and drafted the manuscript.

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