Cross-sectional Study

ANNALS OF MEDICINE & SURGERY

OPEN

Evaluation of the correlation between Altmetric attention score and citation number of top 50 articles in hip fractures: a cross-sectional study

Yousef Fallah, MD[a], Mohammad Soleimani, MD[a], Seyyed Hossein Shafiei, MD[a,*], Mahin Ahmadi Pishkuhi, PhD[b]

Background: Publications quality evaluation gets more attention nowadays, because of its impact on researchers ranking and academic journals. Beside traditional bibliometric tools, altemetric metrics have been introduced as tools to evaluate the dissemination of a study by the number of views, mentions, and posts on different websites and social medias.

Method: In this study, the authors evaluate the correlation between citation number as a traditional tool and altmetric attention score (AAS) as a new method. Scopus database was searched to find the 50 most cited manuscripts on "hip fractures" title from January 2015 to December 2020. After excluding irrelevant subjects, AAS of included articles was collected from the Altmetric.com website. At the last stage, the data were analyzed using statistical tests.

Results: According to statistical analysis, R^2 was 0.121, and the P-value was 0.017, which shows a weak but statistically significant relationship between citation and AAS. The relationship between the number of mentions on Twitter and the AAS was linear. The differences observed between the two groups were significant only in "Readers on Mendeley" and "Dimensions". Results shown that the impact factor of the journal and the AAS of articles had no significant relationship ($R^2 = 0.001$, P-value = 0.986).

Conclusion: Findings showed that social media does not seem to be ineffective in disseminating published articles. It has also been shown that Twitter can play a significant role in the propagation of articles on social networks. It is not unreasonable to say that the accessibility of a journal affects the dissemination of an article on social media. In the end, the authors found that the impact factor of the journal could not significantly affect the AAS.

Keywords: altmetrics, attention score, fracture, hip fractures, social media

Introduction

The extent of use and great impact of social networks on people's lives is not a secret. According to statistics, more than half of the world's population uses social media[1]. Media that influence a large part of people's daily lives but the question that may occupy the minds of researchers is how these networks can play a role in scientific studies. One of the fields that has attracted a lot of attention recently is the discussion of the studies presented in these social networks and whether it can be used as a tool to evaluate the quality of scientific studies or not. Known tools for researchers that have been widely used so far include bibliometric tools, including citations, impact factors, impact scores, and H-index but with the expansion of social media, new tools were introduced as altmetrics. Altmetrics, in addition to presenting the number of articles presented in each of the social networks such as Twitter, Facebook, Mendeley, Instagram, and finally provide a score under the title of Altmetric Attention Score (AAS).

AAS is a score given to the real-time online activity of articles and can reflect the extent of their spread on social networks. AAS is used as a crucial article metric[2]. AAS consisted of three main factors: (1) volume, (2) sources, and (3) authors. The 'volume' represents how

HIGHLIGHTS

- Media that influence a large part of people's daily lives but the question that may occupy the minds of researchers is how these networks can play a role in scientific studies.
- Beside traditional bibliometric tools, altemetric metrics have been introduced as tool to evaluate the dissemination of a study by the number of views, mentions, and posts on different websites and social medias.
- Altmetric Attention Score is a score given to the real-time online activity of articles and can reflect the extent of their spread on social networks.
- Findings showed that social media does not seem to be ineffective in disseminating published articles.
- It has also been shown that Twitter can play a significant role in the propagation of articles on social networks.

[a]Orthopedic Surgery Research Center (OSRC), Sina University Hospital and [b]Department of Epidemiology and Biostatistics, School of Public Health,Tehran University of Medical Sciences, Tehran, Iran

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Orthopedic Surgery Research Center (OSRC), Sina University Hospital, Tehran University of Medical Sciences, Tehran, Iran. Tel.: +98 216 312 0000; fax: +98 216 312 1297. E-mail: dr_hshafiei@yahoo.com (S.H. Shafiei).

Annals of Medicine & Surgery (2023) 85:4750–4756

Received 20 March 2023; Accepted 2 August 2023

Published online 15 August 2023

http://dx.doi.org/10.1097/MS9.0000000000001149

Table 1

List of 50 most cited articles in Scopus in 2015–2020

ID	Title	First author	Journal	Type of article	Year	Open access	Country	Subject	Citation number
1	Comprehensive geriatric care for patients with hip fractures: a prospective, randomized, controlled trial (12)	Prestmo A	*The Lancet*	Original	2017	No	Norway	Patient care	265
2	A critical review of the long-term disability outcomes following hip fracture (13)	Dyer S.M.	*BMC Geriatrics*	Review	2015	Yes	Australia	Hip fx outcome	192
3	Trends in media reports, oral bisphosphonate prescriptions, and hip fractures 1996–2012: an ecological analysis (14)	Jha S	*Journal of Bone and Mineral Research*	Original	2015	Yes	United States	Factors affecting surgery	112
4	Impact of hip fracture on hospital care costs: a population-based study (15)	Leal J., Gray A.M.,	*Osteoporosis International*	Original	2015	Yes	United Kingdom	Cost (economic burden)	111
5	Anesthesia for hip fracture surgery in adults (16)	Guay J	*Cochrane Database of Systematic Reviews*	Review	2015	Yes	Canada	Anesthesia	93
6	Length of hospital stay after hip fracture and short term risk of death after discharge: a total cohort study in Sweden (17)	Nordstr" P	*BMJ (Online)*	Original	2017	Yes	Sweden	Hip fx outcome	91
7	Excess mortality after hip fracture in elderly persons from Europe and the USA: the CHANCES project (18)	Katsoulis M.,	*Journal of Internal Medicine*	Review	2016	Yes	Greece	Hip fx outcomes	84
8	Diabetes mellitus and risk of hip fractures: a meta-analysis (19)	Fan Y., Wei	*Osteoporosis International*	Review	2018	Yes	China	Risk factors	83
9	Recovery of health-related quality of life in a United Kingdom hip fracture population: the Warwick hip trauma evaluation - A prospective cohort study (20)	Griffin X.L	*Bone and Joint Journal*	Original	2016	No	United Kingdom	Hip fx outcome	82
10	The impact of a National clinician-led audit initiative on care and mortality after hip fracture in England (21)		*Medical Care*	Original	2015	Yes	United Kingdom	Hip fx outcomes	81
11	Red blood cell transfusion for people undergoing hip fracture surgery (22)	Brunskill S.J	*Cochrane Database of Systematic Reviews*	Review	2015	Yes	United Kingdom	Factors affecting surgery	80
12	Outcomes after hip fracture surgery compared with elective total hip replacement (23)	Manach Y.L.	*JAMA - Journal of the American Medical Association*	Original	2017	Yes	France	Hip fx surgery outcome	80
13	Quality of life after hip fracture in the elderly: a systematic literature review (24)	Peeters C.M. M	*Injury*	Review	2016	No	Netherlands	Hip fx outcome	77
14	Overdiagnosis of bone fragility in the quest to prevent hip fracture (25)	J "rvinen.	*The BMJ*	Original	2015	Yes	Finland	Factors affecting hip fracture	77
15	Delay in hip fracture surgery: an analysis of patient-specific and hospital-specific risk factors (26)	Ryan D.J.,	*Journal of Orthopedic Trauma*	Original	2015	No	United States	Hip surgery outcomes	74
16	Management of hip fractures in the elderly (27)	Roberts K.C.,	*Journal of the American Academy of Orthopedic Surgeons*	Review	2016	yes	United States	Treatment	74
17	Hip fracture trends in the United States, 2002–2015 (28)	Michael Lewiecki E.	*Osteoporosis International*	Original	2015	Yes	United States	Epidemiology	74
18	Preoperative risk factors for postoperative delirium following hip fracture repair: a systematic review (29)	Oh E.S	*International Journal of Geriatric Psychiatry*	Review	2015	Yes	United States	Complications	73
19	Management of acute hip fracture (30)	Bhandari M.,	*New England Journal of Medicine*	Original	2016	No	United States	Treatment	73
20	Epidemiology and social costs of hip fracture (31)	Veronese N	*Injury*	Review	2015	No	Italy	Epidemiology	72
21	Predicting 30-day mortality following hip fracture surgery: evaluation of six risk prediction models (32)	Karres J.	*Injury*	Original	2018	No	Netherlands	Hip surgery outcome	72
22	Pericapsular Nerve Group (PENG) Block for Hip Fracture (33)	Gir¢n.	*Regional Anesthesia and Pain Medicine*	Original	2015	No	Canada	Treatment	71
23	Burden of hip fracture using disability-adjusted life-years: a pooled analysis of prospective cohorts in the CHANCES consortium (34)	Papadimitriou N.,	*The Lancet Public Health*	Original	2015	Yes	Greece	Hip fx outcomes	70
24	Nutritional supplementation for hip fracture aftercare in older people (35)	Avenell A.	*Cochrane Database of Systematic Reviews*	Review	2015	Yes	United Kingdom	Factors affecting treatment	69
25	Secondary analysis of outcomes after 11 085 hip fracture operations from the prospective UK Anesthesia Sprint Audit of Practice (ASAP-2) (36)	White S.M	*Anesthesia*	Original	2016	Yes	United Kingdom	Hip surgery outcome	67
26	Glycated hemoglobin level and risk of hip fracture in older people with type 2 diabetes: a competing risk analysis of Taiwan diabetes cohort study (37)	Li C.-I.	*Journal of Bone and Mineral Research*	Original	2018	Yes	Taiwan	Factors affecting hip fracture	67

Table 1

(*Continued*)

ID	Title	First author	Journal	Type of article	Year	Open access	Country	Subject	Citation number
27	Hip fracture incidence in Japan: Estimates of new patients in 2012 and 25-year trends (38)	Orimo H.,	*Osteoporosis International*	Original	2016	Yes	Japan	Epidemiology	67
28	Risk factors for hip fracture in older men: the osteoporotic fractures in men study (MrOS) (39)	Cauley J.A.	*Journal of Bone and Mineral Research*	Original	2015	Yes	United States	Risk factors	63
29	Fracture fixation in the operative management of hip fractures (FAITH): an international, multicentre, randomized controlled trial (40)	Nauth A.,	*The Lancet*	Original	2017	Yes	international (eight countries)	Treatment	63
30	Hip fracture, mortality risk, and cause of death over two decades (41)	von Friesendorff M.,	*Osteoporosis International*	Original	2017	Yes	Sweden	Hip fx outcomes	62
31	Risk factors for postoperative delirium following hip fracture repair in elderly patients: a systematic review and meta-analysis (42)	Yang Y	*Aging Clinical and Experimental Research*	Review	2017	Yes	China	Complication of surgery	61
32	Postoperative blood transfusion strategy in frail, anemic elderly patients with hip fracture (43)	Gregersen M	*Acta Orthopaedica*	Original	2015	Yes	Denmark	Factors affecting treatment	60
33	Clinical effectiveness of orthogeriatric and fracture liaison service models of care for hip fracture patients: population-based longitudinal study (44)	Hawley S	*Age and Ageing*	Original	2016	Yes	United Kingdom	Hip surgery outcome	60
34	Hip fracture in patients with non-dialysis-requiring chronic kidney disease (45)	Kim S.M	*Journal of Bone and Mineral Research*	Original	2018	Yes	United States	Risk factors	59
35	Impact of the U.S. Food and Drug Administration's Safety-related announcements on the use of bisphosphonates after hip fracture (46)	Kim S.C	*Journal of Bone and Mineral Research*	Original	2017	Yes	United States	Factors affecting treatment	59
36	Use of osteoporosis medications after hospitalization for hip fracture: a cross-national study (47)	Kim S.C	*American Journal of Medicine*	Original	2015	Yes	South Korea	Factors affect treatment	58
37	Malnutrition according to mini nutritional assessment is associated with severe functional impairment in geriatric patients before and up to 6 months after hip fracture (48)	Goisser S.,	*Journal of the American Medical Directors Association*	Original	2016	no	Germany	Factors affecting hip fracture	55
38	Nutritional status and nutritional treatment are related to outcomes and mortality in older adults with hip fracture (49)	Malafarina V.,	*Nutrients*	Review	2016	Yes	Spain	Factors affecting hip fracture	55
39	Patient-specific finite element estimated femur strength as a predictor of the risk of hip fracture: the effect of methodological determinants (50)	Qasim M.	*Osteoporosis International*	Original	2015	Yes	United Kingdom	Factors affecting hip surgery	52
40	Dementia and delirium, the outcomes in elderly hip fracture patients (51)	Mosk C.A	*Clinical Interventions in Aging*	Original	2015	YES	Netherlands	Hip fx outcome	50
41	Association between wait time and 30-day mortality in adults undergoing hip fracture surgery (52)	Pincus D	*JAMA - Journal of the American Medical Association*	Original	2015	Yes	Canada	Factors affecting hip fx	50
42	Association between frailty, osteoporosis, falls and hip fractures among community-dwelling people aged 50 years and older in Taiwan: Results from I-Lan Longitudinal Aging Study (53)	Liu L.-K.,	*PLoS ONE*	Original	2015	Yes	Taiwan	Factors affecting hip fracture	50
43	The ICD-10 Charlson Comorbidity Index predicted mortality but not resource utilization following hip fracture (54)	Toson B.,	*Journal of Clinical Epidemiology*	Original	2016	no	Australia	Hip fx outcomes	49
44	Postoperative length of stay and 30-day readmission after geriatric hip fracture: an analysis of 8434 patients (55)	Basques B.A.,	*Journal of Orthopedic Trauma*	Original	2017	No	United States	Hip fx outcomes	49
45	Factors affecting delay to surgery and length of stay for patients with hip fracture (56)	Ricci W.M.,	*Journal of Orthopedic Trauma*	Original	2016	No	United States	Factors affecting treatment	49
46	One-year mortality after hip fracture: development and validation of a prognostic index (57)	Cenzer I.S.,	*Journal of the American Geriatrics Society*	Original	2017	Yes	United States	Hip fx outcomes	49
47	General vs. neuraxial anesthesia in hip fracture patients: a systematic review and meta-analysis (58)	Van Waesberghe J	*BMC Anesthesiology*	Review	2016		Germany	Anesthesia	48
48	Abdominal obesity increases the risk of hip fracture. A population-based study of 43 000 women and men aged 60–79 years followed for 8 years. Cohort of Norway (59)	Sogaard A.J.	*Journal of Internal Medicine*	Original	2016	Yes	Norway	Factors affecting hip fracture	48
49	Improved 1-year mortality in elderly patients with a hip fracture following integrated orthogeriatric treatment (60)	Folbert E.C.	*Osteoporosis International*	Original	2016	Yes	Netherlands	Hip surgery outcomes	48

many people give attention to the article. There are various categories of attention, which have different predetermined scores, and it is named 'sources'. The third factor is 'authors', which mentions how frequently the people who give attention discuss scholarly articles[3]. These three factors make a single score through a predetermined algorithm[4].

Since 2010, when AAS was introduced, studies have been conducted to analyze the AAS of top articles based on traditional bibliometric tools in different fields and evaluate the AAS of top articles with bibliometric data[1,5,6].

Today, a limited number of papers have been conducted to compare AAS with the citation numbers in the orthopedic field. Among various orthopedic fields, hip fracture and its related fields, for example treatment and outcome, are very important due to its high prevalence, significant mortality, and daily-increasing disease burden[7,8]. Therefore, this study aimed to evaluate the correlation between AAS and the citation number of the top 50 articles in hip fractures and its related fields.

Methods

Search strategy

This cross-sectional study was performed from April 2020 to September 2021. The Scopus database was searched with the term of 'Hip Fracture' to find the 50 most cited manuscripts with the subject of hip fractures from January 2015 to December 2020 by two authors separately. And the study has been reported in line with the strengthening the reporting of cohort, cross-sectional, and case–control studies in surgery (STROCSS) criteria[9].

Inclusion/exclusion criteria

From the search, 50 articles were included. After the initial review of the articles, non-English and irrelevant articles to hip fracture were excluded from the study.

Data extraction

The data collection was done in such a way that, in the first stage, the 50 included titles were checked separately by two authors for including English studies and investigating the relevancy of the study to the hip fracture title, so if there was any inconsistency they were examined by a third author. At the next stage, after the approval of the entered studies, data extraction was started. Two authors separately extracted the information of each article, including the first author, journal, type of article, year of publication, accessibility, country, and citation number were collected for all included articles. In addition to AAS, the number of Tweeters, Dimensions, readers on Mendeley, Facebook pages, policy sources, news outlets, blogs, patents, Wikipedia pages, research highlight platforms, and Redditors were retrieved for each article via 'Bookmarklet for Researchers' from the Altmetric.com website., and if there was a discrepancy in their information, it was checked by a third person.

In the last part of the study two groups were separated based on the articles accessibility for further assessments.

Statistical analysis

To analyze the obtained data Kruskall–Wallis test used to compare Altmetric score among different categories. Since the study data were not normally distributed the Spearman rank correlation coefficient was used to describe the correlation between study variables.

The median and ranges of values (minimum–maximum) were used to describe general data.

Data analysis was performed in SPSS v.21.

All the analysis were done by an expert methodologist.

Results

According to assessments and results, of the 50 selected studies, one study was excluded because of its non-English language, so a total of 49 articles published with a title related to hip fractures were included.

The journals with the most identified articles were Osteoporosis International with seven published articles ($n=7$, 14.2%), Journal of Bone and Mineral Research with five ($n=5$, 10.2%), and, Cochrane Database of Systematic Reviews, Injury, and Journal of Orthopedic Trauma with 3 ($n=3$, 6.1% for each one) published articles. Journals with less than three published articles are listed in Table 1.

The highest citation number was 265, and the lowest was 48 (on average, 76.08).

Among these 49 articles, 36 were original articles, and 13 were review articles (73.4 vs. 26.6%). Open access articles accounted for 73.4% ($n=36$) of the total.

The most frequent subject with 12 repetitions (24.4%) was hip fracture outcomes (Table 1).

The AAS for the top articles ranges from 0 to 354, with a mean of 58.7.

From all the studies, three articles got zero AAS.

The number of mentions on different social media summarized in Table 2 in the order of the score.

The relationship between citations and AAS shown in Figure 1.

According to statistical analysis, R^2 was 0.121, and the P-value was 0.017, which shows a weak but statistically significant relationship between AAS and citation numbers (Fig. 1).

Figure 2 indicates that the relationship between the number of mentions on Twitter and the AAS is linear. Thus, the number of mentions on Twitter can be considered a good predictor of the final AAS.

The mean (and also minimum–maximum) of citations and altmetric indices in the two groups of journals were compared based on free accessibility using the nonparametric Mann–Whitney U test. Based on the findings, the differences observed in the mentioned indices between the two groups were significant only in 'Readers on Mendeley' and 'Dimensions'.

It showed that open-access journals had a significantly higher number of visits in 'Readers on Mendeley' and 'Dimensions' compared with the journals with nonfree access. Also, it is notable that the maximum of these visits was also significantly higher in open-access journals (Table 3).

In addition, it has shown that the impact factor of the journal had no significant relationship with the AAS of articles ($R^2=0.001$, P-value = 0.986) (Fig. 3).

Discussion

In the current study, we reviewed the top 49 articles about hip fracture according to their citation number and evaluated the correlation between citation number and AAS.

Table 2

Altmetric attention score for the most cited articles

ID	Altemetric Attention Score	Tweeters	Dimensions	Mendeley	Facebook pages	Policy sources	News outlets	Blogs	Patents	Wikipedia pages	Research highlight platform	Redditors
15	354	350	72	114	20	0	13	6	0	0	0	0
19	323	477	96	385	7	0	1	1	0	0	0	0
3	310	254	193	232	13	0	17	2	0	0	1	0
7	264	203	103	120	2	0	14	5	0	0	0	0
8	249	13	104	182	3	0	30	1	0	0	0	0
13	200	120	0	119	3	0	16	2	0	0	0	0
1	179	197	296	388	10	1	2	4	0	0	0	0
4	109	23	128	109	4	0	9	2	0	0	0	0
26	87	111	85	82	5	0	0	2	0	0	1	0
29	83	40	97	262	4	0	6	1	0	0	0	0
10	58	81	92	66	1	1	0	0	0	0	0	0
23	54	84	83	197	1	0	0	0	0	0	0	0
25	41	47	94	437	2	1	0	1	0	1	0	0
42	39	16	61	75	1	0	4	0	0	0	0	0
33	37	64	73	114	0	0	0	0	0	0	0	0
31	36	1	77	90	0	0	4	0	0	0	0	0
20	32	48	85	149	2	1	0	0	0	0	0	0
36	26	7	64	39	2	0	3	0	0	0	0	0
18	25	11	84	84	0	0	2	0	0	0	0	0
24	19	29	78	168	1	0	0	0	0	0	0	0
21	16	12	93	230	1	0	1	0	0	0	0	0
30	15	12	68	95	0	0	1	0	0	0	0	0
35	15	4	68	58	1	0	2	0	0	0	0	0
49	15	5	51	45	0	0	1	0	0	0	0	0
12	14	17	91	295	0	0	0	0	0	1	0	0
6	12	13	104	325	4	0	0	0	0	1	1	0
17	10	15	107	187	0	0	0	0	0	0	0	0
34	9	6	76	146	1	1	0	0	0	0	1	0
38	9	17	63	159	0	0	0	0	0	0	0	0
45	7	10	56	70	1	0	0	0	0	0	0	0
5	6	10	139	254	0	0	0	0	0	0	0	0
11	6	9	94	26	1	0	0	0	0	0	0	0
32	6	5	79	137	0	1	0	0	0	0	0	0
41	6	9	61	144	1	0	0	0	0	0	0	0
14	5	4	96	274	0	1	0	0	0	0	0	0
28	5	7	77	71	1	0	0	0	0	0	0	0
37	4	6	65	76	0	0	0	0	0	0	0	0
9	3	6	27	31	1	0	0	0	0	0	0	0
44	3	4	57	71	1	0	0	0	0	0	0	0
46	3	0	58	70	0	1	0	0	0	0	0	0
22	2	2	84	94	0	0	0	0	0	0	0	0
27	2	4	85	57	0	0	0	0	0	0	0	0
40	2	2	52	119	0	0	0	0	0	0	0	0
47	2	3	59	96	0	0	0	0	0	0	0	0
39	1	1	70	106	0	0	0	0	0	0	0	0
48	1	3	56	163	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
16	0	124	93	108	6	0	12	2	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
15	354	350	72	114	20	0	13	6	0	0	0	0

Our findings showed a weak but statistically significant correlation between citation number and AAS that are consistent with the results of the most previous studies (Barbic, 2016 #208; O'Connor, 2017 #209; Rosenkrantz, 2017 #210).Therefore, social media does not seem to be ineffective in disseminating published articles.

We also found a linear relationship between the number of mentions on Twitter and the AAS. This finding shows that Twitter can play a significant role in the propagation of articles on social networks. And also this result will be beneficial for journals and researchers to propagate their studies more and make them more visible and attractive for readers.

Moreover, 'Readers on Mendeley' and 'Dimensions' indicated a significant difference in the number of visits between the open-access and subscription-based journals. Thus, it is not unreasonable to say that the accessibility of a journal affects the

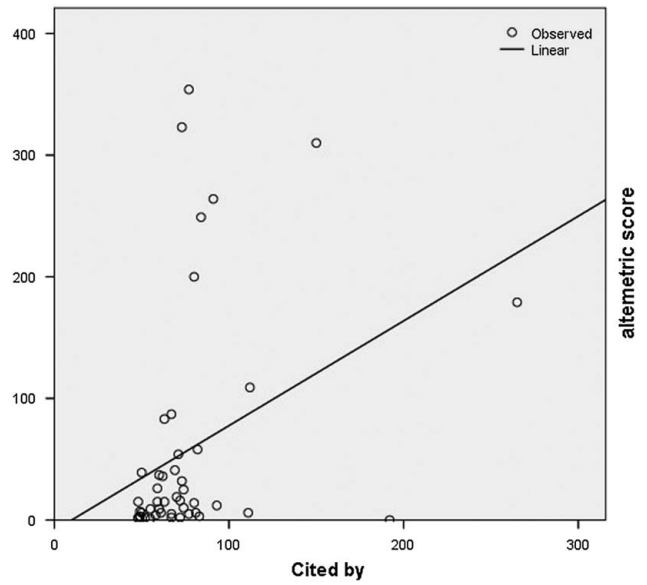

Figure 1. Relationship between citations (in Scopus) and altmetric attention scores (AAS) for all papers.

dissemination of an article on social media. Lots of people find it better to read articles with non obligatory paying options. Actually, it could be discussed based on the paying challenges for journal subscrptions. It shows that although publishing articles with open access journals and paying for publication makes a hard situation for researchers but dissemination and view of such studies will be much more to other studies.

We found that the impact factor of the journal could not significantly affect the AAS. This statement may be against the most of peoples idea that they think, it is important to publish studies in high impacted factor journals for more article visits.

Table 3

Comparison of sciencemetric and altmetric indexes according to journals' accessibility status

	Open access		
	No (13) median (min–max)	Yes (36) median (min–max)	*P*
Cited by	67 (49–84)	70.5 (48–265)	0.541
Altmetric Attention Score	25 (0–354)	13 (0–323)	0.610
Tweeters	11 (0–350)	11 (0–477)	0.883
Blogs	0 (0–6)	0 (0–5)	0.499
Policy sources	0 (0–0)	0 (0–1)	0.066
News outlets	0 (0–30)	0 (0–17)	0.243
Facebook pages	1 (0–20)	1 (0–13)	0.592
Readers on Mendely	82 (0–182)	128.5 (0–437)	0.045
Dimensions	64 (0–104)	84.5 (0–296)	0.015

Due to the increasing use of social networks, attention to altmetrics has also been expanded in the research field. Recently, many studies have been conducted in various medical and non-medical fields in this subject.

In general, when we look at this relationship in other studies, most of them showed a weak relationship between them, while Twitter is mentioned as the social network with the most impact in studies[2–5,10,11]. For example, Jeremy *et al.* (Chang, 2019 #212) evaluated this correlation between Pediatric Surgery Core Journals and they found a weak relationship between them. J. *et al.* (Kolahi, 2020 #215) study also shown a weak relationship in the field of Endodontology. In addition to these studies, if we investigate the field of orthopedics, we can mention Mirghaderi *et al.*'s study (Mirghaderi, 2022 #214) that reported a similar result. It is better to mention that there are also cases that have reported a strong relationship (Costas, 2015 #207) or, on the other hand, the absence of any relationship (Kolahi, 2020 #216).

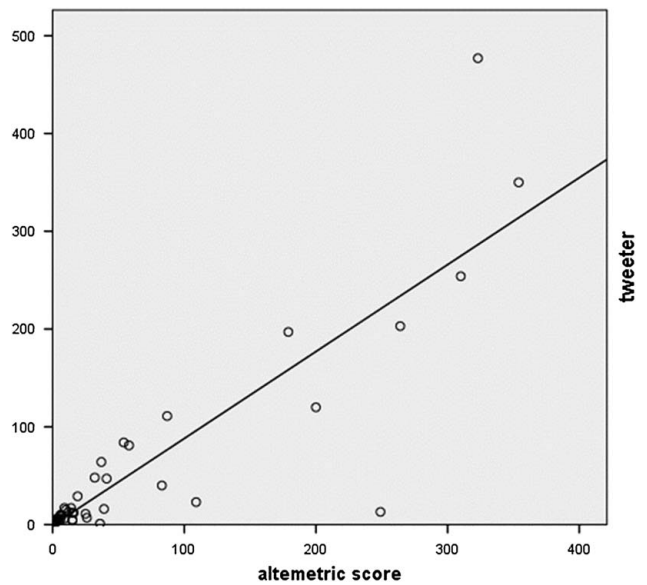

Figure 2. Relationship between altmetric attention scores (AAS) and mentions on Tweeters in all papers.

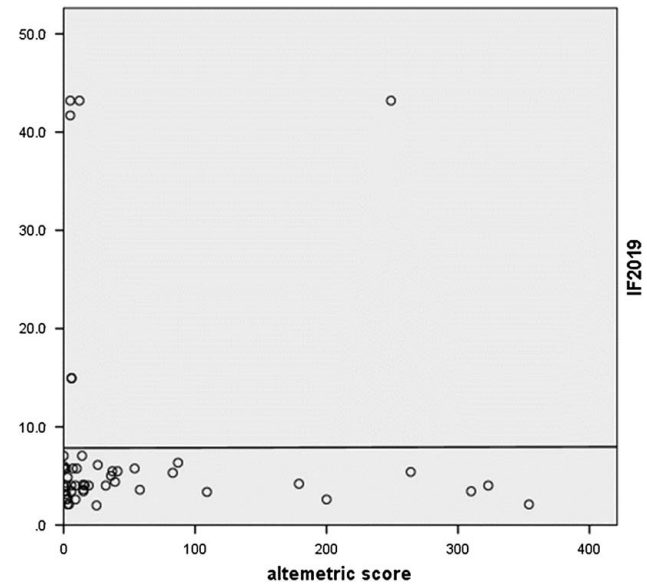

Figure 3. Relationship between journals' impact factor (in 2019) and altmetric attention scores AAS.

What is the purpose of all these studies? To determine whether altmetrics and sharing and reading researches in social medias can be a suitable substitute for indexing studies.

Costas *et al*. (Costas, 2015 #207) reported a strong correlation between citations and AAS, but other studies have exhibited that the associations between AAS, citation rate, and journal impact factor are weak (Mirghaderi, 2022 #214) (Barbic, 2016 #208) (O'Connor, 2017 #209) (Rosenkrantz, 2017 #210). In addition, Haustein *et al*. (Haustein, 2015 #211) analyzed 1.3 million papers published in 2012 and represented a correlation between the number of references, citations, and social media metrics. So we hypothesized that there might be a relationship between citations and AAS in the field of hip fractures.

There were also some limitations in our study. First, reviewing the top 49 articles about hip fractures may not be a good representation of the millions of articles published by various journals, but it was the best way available. So most likely, our findings, especially about the influential articles, will be correct. Second, it should be noted that online sharing of articles, unlike the number of citations, does not necessarily mean reading them. Therefore, it is better to think of AAS as just propagation an article on social media, not reading it. Despite all the limitations of our study, we believe that the results obtained can be a starting point for scientists who want to publish their studies more widely.

Conclusion

A review of 49 articles on hip fractures showed us a correlation between AAS and the number of citations. Furthermore, there is a direct and linear relationship between the AAS and the number of mentions on Twitter. Consequently, it is a point for scientists that the propagation of an article on social media, especially Twitter, can make their study more widely read. It is wise to note that the impact factor of a journal had no significant effect on the AAS.

Ethical approval

This research method was approved by Ethical Committee of Tehran University of Medical Sciences.

Consent

Taking consent is not necessary for this study because in this study there were not any patient contribution.

Source of funding

This study was not funded by any organization.

Author contribution

S.H.S.: conceptualization and review; M.S.: data collection and writing; Y.F.: data collection and final edit; M.A.P.: data analysis.

Conflicts of interest disclosure

The authors declare that there is no conflicts of interest.

Research registration unique identifying number (UIN)

Although researchers of this study were tried to register this study to 'research registery' but due to financial problems they could not pay to register their study.

Guarantor

Dr Seyyed Hossein Shafiei as the corresponding author accepts full responsibility for this work.

Provenance and peer review

Not commissioned, externally peer reviewed.

Data availability statement

All the data are available with the corresponding author.

Acknowledgements

The authors thank the respected staff of our Hospital who helped us in carrying out this project.

References

[1] Auxier B, Anderson M. Social media use in 2021. Pew Research Center 2021;1:1–4.
[2] Kim Y, Kim J-E, Kim YH, *et al*. Social attention and scientific articles on stroke: altmetric analysis of top-50 articles. Clin Neurol Neurosurg 2019; 183:105386.
[3] Kolahi J, Khazaei S, Iranmanesh P, *et al*. Altmetric analysis of the contemporary scientific literature in Endodontology. Int Endod J 2020;53: 308–16.
[4] Lopez M, Chan TM, Thoma B, *et al*. The social media editor at medical journals: responsibilities, goals, barriers, and facilitators. Acad Med 2019;94: 701.
[5] Ramamurti P, Gu A, Fassihi SC, *et al*. Correlation between altmetric score and traditional bibliometrics in total joint arthroplasty research. Arthroplast Today 2021;7:225–9.
[6] Kim J-E, Kim Y, Park KM, *et al*. Top 100 Publications as Measured by Altmetrics in the Field of Central Nervous System Inflammatory Demyelinating Disease. BioMed Res Int 2019;2019:3748091.
[7] Papadimitriou N, Tsilidis KK, Orfanos P, *et al*. Burden of hip fracture using disability-adjusted life-years: a pooled analysis of prospective cohorts in the CHANCES consortium. The Lancet Public Health 2017;2: e239–46.
[8] Johnell O, Kanis JA. An estimate of the worldwide prevalence, mortality and disability associated with hip fracture. Osteopor Int 2004;15: 897–902.
[9] Mathew G, Agha R, Albrecht J, *et al*. Strocss 2021: strengthening the reporting of cohort, cross-sectional and case–control studies in surgery. Int J Surg Op 2021;37:100430.
[10] Azer SA, Azer S. Top-cited articles in medical professionalism: a bibliometric analysis versus altmetric scores. BMJ Open 2019;9:e029433.
[11] Hassona Y, Qutachi T, Dardas L, *et al*. The online attention to oral cancer research: an altmetric analysis. Oral Dis 2019;25:1502–10.