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An author level metrics of scholarly impact journals; cited through Google Scholar Source

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Abstract

As academic journals have become more digital, scientific writers now have more chances to increase the visibility of their research and its citations globally. The metrics is the gold standard. It is used to decide the ranking and benchmark of the journals which will be determined using bibliometrics and different algorithms. Numerous predatory journals are lack of international standards and low quality. Authors will be unable to submit their research papers or reports to the journals for publication with a high impact factor in this circumstance. The main objective of this study is to focus on identifying the global citations by investigating the author level metrics of the top hundred scholarly publications. Data were gathered from Google Scholar source between January 2021 and September 2022 for the study, which was quantitative in nature. Hypothesis was tested by simulation growth model and statistically approximates the h_5 citation and Journal impact factor. Asper the results, top hundred first ranking was seen in Nature Reviews and Molecular Cell Biology (h_5 155, IF 113.90 h5 median 340) followed by nature reviews immunology (h_5 152, IF 108.60 h5 median 292), The highest ranking discipline that was substantially correlated with citation was health and medical sciences (r = 0.91, R^2 % = 0.97) followed by physics and mathematics (r = 0.89, R^2 % = 0.94).Finally, this study implies that open access journals should have display metrics information for the researchers which can be act as formidable tool for the publishers, scientists and researchers enabling them to make informed decisions at the appropriate moment and disseminate scientific knowledge globally.

Keywords: Journal impact factor; H5 citation; Indexing; Author level metrics

1. Introduction

There have been several small and large-scale research projects undertaken globally. Effective inference, hypothesis testing, and article publication are conducted out after the study data has been gathered. Finally, our study findings are published in outstanding journals where they are accessible to people everywhere. But because of the illusive power of predatory journals, numerous academics have submitted their research publications to various journals that have rejected them because they were ignorant of the information in the journals or how to prevent plagiarism. Additional justifications to refrain from publishing in H-factor journals include data fabrication, the impractical use of statistical procedures, poorly chosen research questions without taking the research's logic into account, and research data hacking. More instances include falsifying research results, failing to obtain institutional ethical board approval for animal and human intervention studies, interpreting results ineffectively, having poor confidence in the goal of interest, and selecting the wrong research topics. However, the research pedagogy is growing exponentially on a global scale in

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order to distribute information through research articles, research notes, brief notes, newsletters, and research monographs etc. Information transfer also depends on the study paper's publishing in H-factor journals. Citing published research articles is essential for efficient indexing tools, according to leading publishers in the current globalization . The eigen value and citation score for H-factor journals will change yearly for the benefit of researchers. In order to increase the precision of citations, researchers should study and navigate highly cited research journals with an excellent publication track record on a global scale (COPE, 2021). The current work attempts to choose the author level metrics of top hundred publications in this regard and evaluates the hypothesis using the relevant statistical methods. These studies can help apply new thoughts and ideas for raising the standard of citation scores and journals on a global scale for researchers and publishers.

2. Methods

The following components and formula used for calculation of citations. Top hundred research journals (according to the h_5 citation) were used to retrieve the cited research papers from the Google Scholar source. The physical cross-checking of every journal was done, and the global impact factor was calculated. Modeling was done for Journal impact factor (JIF) and h_5 indexes. $Y_r = ab^x$ is the formula for the logistic regression model, where 'Yr' stands for the dependent variable h_5 index score for each journal, 'a' for the intercept, 'b' for the regression coefficient, and 'x' for the random variable of journal worldwide impact factor as of March 2022.

2.1. Journal impact factor calculation

Impact factor (IF) of a journal is calculated by dividing the number of current years citations to the items published in that journal during the previous two years. For example: - citation received 2022 to the items published in Year 2020 = 530

$$\frac{\text{Year 2021} = 350}{\text{Total} = 880 \text{ cites}}$$

Number of items (articles) published in the year 2020 = 80

$$-\frac{\text{Year 2021= 90}}{\text{Total =170 items /research papers}}$$

$$\text{Calculation} = \frac{\text{No.of citations}}{\text{No.of research papers}} = \frac{880}{170} = 5.176 \text{ Journal impact factor for the year 2022}$$

The frequency with which the average article in a journal has been cited over a specific time period is measured by the journal impact factor, which is frequently used to assess a journal's relative importance in its field. Journals with more review articles and higher circulation have the highest impact factors, according to the above formula: Journal impact factor total number of times its articles was cited during the two previous years / total number of citable articles in the journal during those two years.

2.2. H5-Index (author level metrics)

The h_5 index is an author-level matrix that aims to assess the output and citation impact of a scientist's or research scholar's articles. An academic with an h_5 index has at least twenty articles that have each acquired at least twenty citations. The index, often known as the H-index or Hirsch index was proposed by Jorge E. Hirsch in 2005.

$$H_5 = \frac{f_i}{\sum_{i=1}^{20} f}$$

Where, f_i = the frequency of citation at i th research paper published in particular year

$\sum_{i=1}^{20} f = N$ (One paper cited twenty times)

2.3. H5- median

H5-median for a publication is the median number of citations for the articles that make up its h_5-index (Google Scholar).

2.4. i_{10}- index

The i_{10}- index was created by Google scholar in 2011 as an index to rank author impact. Simply it is the number of publications the researchers has written that have at least ten citations

$$i_{10} = \frac{f_i}{\sum_{i=1}^{10} f}$$

Where, f_i = the frequency of citation at ith research paper published in particular year

$\sum_{i=1}^{20} f = N$ (one paper cited ten times)

2.5. G-index

Leo Egghe proposed the G-index in his work titled Theory and practice of the G-Index in 2006. It is a measure of scientific production based on publication records. The G index is a replacement for the more traditional H-index, which does not average the quantity of citations. A researcher or academic with a G-index has written at least twenty publications, the sum of which has been cited at least four hundred times. The G-index will give highly cited articles more weight.

$$\mathrm{G_{index}} = \text{ At least twenty articles published } = \frac{\mathrm{f_i}}{\sum\sum_{i=1}^{400} \mathrm{f_i}}$$

$\mathrm{f_i}$ = Number of artciles published (min 20)

$$\sum\sum_{\mathrm{i=1}}^{400} \mathrm{f_i} = \text{Pooled or combined citations of twenty published articles}$$

The cumulative growth of citations was calculated by the following mathematical derivation of power function

$$Log_b(x^y) = y.Log_b(x) \qquad (1.1)$$

Where, X= h_5 index and 'y' is Journal impact factor

From equation (1.1) we calculated the growth of Nature Reviews and Molecular Cell Biology, journal impact factor is 113.90, h_5 index in 2022 was 155

$$Log_b(x^y) = y.Log_b(x)$$

$$Log_b(x^y) = 113.90 \, . Log_b(155)$$

$$Log_b(155)\text{=}2.17\text{x}113.90 = 247.16$$

3. Results

Table 1 Author level metrics of Scholarly Impact Journals in 2021-2022

Rank	Publications	Journal impact factor (JIF)	h_5-Index	h_5-Median
1	Nature Reviews and Molecular Cell Biology	113.9	155(0.79%)	340(1.13%)
2	Nature Reviews Immunology	108.6	152(0.77%)	292(0.97%)
3	Circulation	93.92	189(0.96%)	301(1.00%)
4	BMJ	93.33	190(0.97%)	307(1.02%)
5	The New England Journal of Medicine	91.24	432(2.20%)	780(2.59%)
6	Nature Medicine	87.24	235(1.20%)	389(1.29%)

7	The Lancet Infectious Diseases	71.42	173(0.88%)	296(0.98%)
8	Nature Biotechnology	68.16	175(0.89%)	315(1.05%)
9	Nature Energy	67.44	170(0.87%)	314(1.04%)
10	Chemical Reviews	61.55	265(1.35%)	444(1.48%)
11	Chemical Society Reviews	54.56	244(1.24%)	386(1.28%)
12	The Lancet Oncology	54.43	202(1.03%)	329(1.09%)
13	Nature Materials	47.66	181(0.92%)	265(0.88%)
14	Journal of Clinical Oncology	44.54	213(1.08%)	315(1.05%)
15	Nature Genetics	41.38	191(0.97%)	297(0.99%)
16	Joule	41.25	152(0.77%)	233(0.78%)
17	Nature Nanotechnology	39.21	163(0.83%)	264(0.88%)
18	Nature Photonics	38.77	152(0.77%)	228(0.76%)
19	Nature	38.55	444(2.26%)	667(2.22%)
20	Cell	38.55	300(1.53%)	505(1.68%)
21	Energy & Environmental Science	38.53	202(1.03%)	290(0.96%)
22	European Heart Journal	35.86	163(0.83%)	265(0.88%)
23	Annals of Oncology	32.98	159(0.81%)	243(0.81%)
24	International Conference on Machine Learning	32.40	237(1.21%)	421(1.40%)
25	Immunity	31.74	158(0.80%)	242(0.81%)
26	Advanced Energy Materials	29.7	220(1.12%)	300(1.00%)
27	Nature Methods	28.55	165(0.84%)	296(0.98%)
28	Advanced Materials	28.12	312(1.59%)	418(1.39%)
29	Cell Metabolism	27.29	153(0.78%)	211(0.70%)
30	AAAI Conference on Artificial Intelligence	25.57	180(0.92%)	296(0.98%)
31	Molecular Cancer	25.55	145(0.74%)	209(0.70%)
32	IEEE Communications Surveys & Tutorials	25.25	159(0.81%)	304(1.01%)
33	Nature Neuroscience	24.88	162(0.82%)	248(0.82%)
34	IEEE Transactions on Pattern Analysis and Machine Intelligence	24.31	165(0.84%)	293(0.97%)
35	Journal of the American College of Cardiology	24.09	195(0.99%)	276(0.92%)
36	Blood	23.63	165(0.84%)	229(0.76%)
37	ACS Energy Letters	23.10	155(0.79%)	212(0.71%)
38	Conference on Empirical Methods in Natural Language Processing (EMNLP)	23.10	154(0.78%)	249(0.83%)
39	Gut	23.06	155(0.79%)	235(0.78%)
40	Morbidity and Mortality Weekly Report	23.02	163(0.83%)	302(1.00%)
41	Gastroenterology	22.68	166(0.84%)	254(0.84%)
42	IEEE/CVF Conference on Computer Vision and Pattern Recognition	22.39	389(1.98%)	627(2.09%)

43	European Conference on Computer Vision	22.39	186(0.95%)	321(1.07%)
44	Accounts of Chemical Research	22.38	159(0.81%)	211(0.70%)
45	The Lancet	22.23	354(1.80%)	635(2.11%)
46	IEEE/CVF International Conference on Computer Vision	21.94	239(1.22%)	415(1.38%)
47	Nature Climate Change	21.72	144(0.73%)	228(0.76%)
48	Applied Catalysis B: Environmental	21.41	192(0.98%)	246(0.82%)
49	Advanced Functional Materials	19.92	210(1.07%)	280(0.93%)
50	Nature Physics	19.68	151(0.77%)	222(0.74%)
51	Molecular Cell	19.33	149(0.76%)	202(0.67%)
52	ACS Nano	18.03	211(1.07%)	277(0.92%)
53	Nano Energy	17.88	172(0.88%)	232(0.77%)
54	Neuron	17.17	164(0.83%)	231(0.77%)
55	Nucleic Acids Research	16.97	238(1.21%)	550(1.83%)
56	Angewandte Chemie	16.82	245(1.25%)	332(1.10%)
57	Renewable and Sustainable Energy Reviews	16.80	227(1.16%)	324(1.08%)
58	Journal of the American Chemical Society	15.42	242(1.23%)	344(1.14%)
59	Nature Communications	15.41	307(1.56%)	428(1.42%)
60	Science	15.19	401(2.04%)	614(2.04%)
61	Small	15.15	150(0.76%)	196(0.65%)
62	Science Advances	14.14	197(1.00%)	294(0.98%)
63	Clinical Cancer Research	13.80	146(0.74%)	201(0.67%)
64	Chemical engineering journal	13.27	181(0.92%)	224(0.75%)
65	ACS Catalysis	13.08	163(0.83%)	220(0.73%)
66	Proceedings of the National Academy of Sciences	12.78	256(1.30%)	364(1.21%)
67	Journal of Materials Chemistry A	12.73	178(0.91%)	220(0.73%)
68	JAMA	12.34	267(1.36%)	425(1.41%)
69	Nano Letters	12.26	164(0.83%)	207(0.69%)
70	Cochrane Database of Systematic Reviews	12.08	165(0.84%)	243(0.81%)
71	Bioresource Technology	11.88	146(0.74%)	190(0.63%)
72	International Conference on Learning Representations	11.38	286(1.46%)	533(1.77%)
73	Science of The Total Environment	10.75	225(1.15%)	311(1.03%)
74	ACS Applied Materials & Interfaces	10.38	177(0.90%)	223(0.74%)
75	Cell Reports	9.99	149(0.76%)	205(0.68%)
76	IEEE Internet of Things Journal	9.93	144(0.73%)	212(0.71%)
77	Applied Energy	9.74	173(0.88%)	217(0.72%)
78	PLoS One Biology	9.53	198(1.01%)	278(0.92%)

79	Journal of Cleaner Production	9.29	211(1.07%)	273(0.91%)
80	Physical Review Letters	9.18	207(1.05%)	294(0.98%)
81	American Economic Review	9.17	160(0.81%)	263(0.87%)
82	Clinical Infectious Diseases	9.08	153(0.78%)	278(0.92%)
83	Environmental Science & Technology	9.03	158(0.80%)	214(0.71%)
84	Environmental Pollution	8.07	152(0.77%)	222(0.74%)
85	Meeting of the Association for Computational Linguistics (ACL)	7.77	169(0.86%)	304(1.01%)
86	Journal of Business Research	7.55	145(0.74%)	233(0.78%)
87	Computers in Human Behaviour	6.83	152(0.77%)	214(0.71%)
88	Frontiers in Immunology	6.42	173(0.88%)	228(0.76%)
89	Neural Information Processing Systems	6.33	278(1.41%)	436(1.45%)
90	International Journal of Molecular Sciences	6.20	183(0.93%)	253(0.84%)
91	Frontiers in Microbiology	6.06	151(0.77%)	225(0.75%)
92	The Astrophysical Journal	5.87	167(0.85%)	234(0.78%)
93	Journal of High Energy Physics	5.81	160(0.81%)	220(0.73%)
94	Sensors	5.76	145(0.74%)	201(0.67%)
95	Nutrients	5.71	159(0.81%)	214(0.71%)
96	Physical Review D	5.29	155(0.79%)	217(0.72%)
97	Monthly Notices of the Royal Astronomical Society	5.23	155(0.79%)	194(0.65%)
98	Scientific Reports	4.99	206(1.05%)	274(0.91%)
99	International Journal of Environmental Research and Public Health	3.39	152(0.77%)	225(0.75%)
100	IEEE Access	3.36	200(1.02%)	303(1.01%)

$Y_{h5}\ index = 180.60 * 1.001^{Journal\ global\ impact}$ Correlation r = 0.123, R squared = 0.15

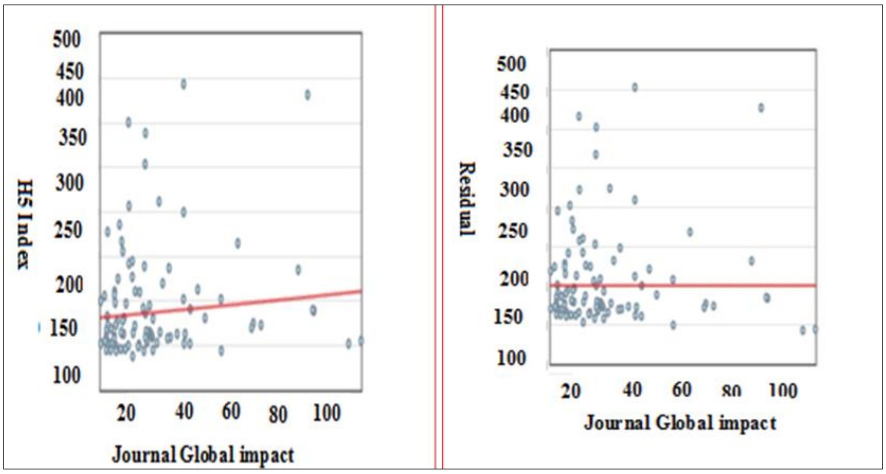

Figure 1 The scattered plots of journal worldwide impact and h_5 index with the X-axis stated. Journal worldwide impact factor is displayed from 20 to 100, and the h_5 citation is shown on the Y-axis. Both the citation and impact variables were linearly linked with the regression line, which was fitted with an R^2 (%) = 0.80 coefficient of determination

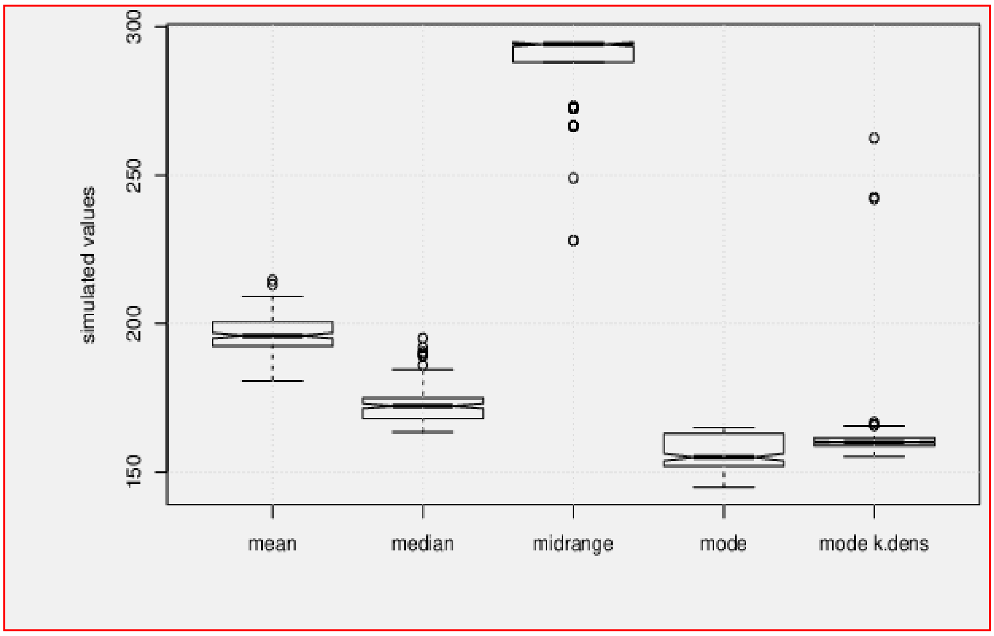

Figure 2 The mean journal impact factor was 35 (IQR 20–40), which illustrates the dispersed plot of journal impact factor and h_5 index, and the values of h_5 citation in the 2022 box and whisker plot. The greatest h_5 index with IQR was 450 times (125-450). With a mean rate of 155, the h_5 index and journal impact factor have a strong to moderate linear association. In general, the citation score will increase in 2022. A box was drawn from the first quartile to the third quartile in a box plot. At the median, a vertical line slashes across the box. The median, mode, and h_5 mean number of citations were 175 and 155 respectively

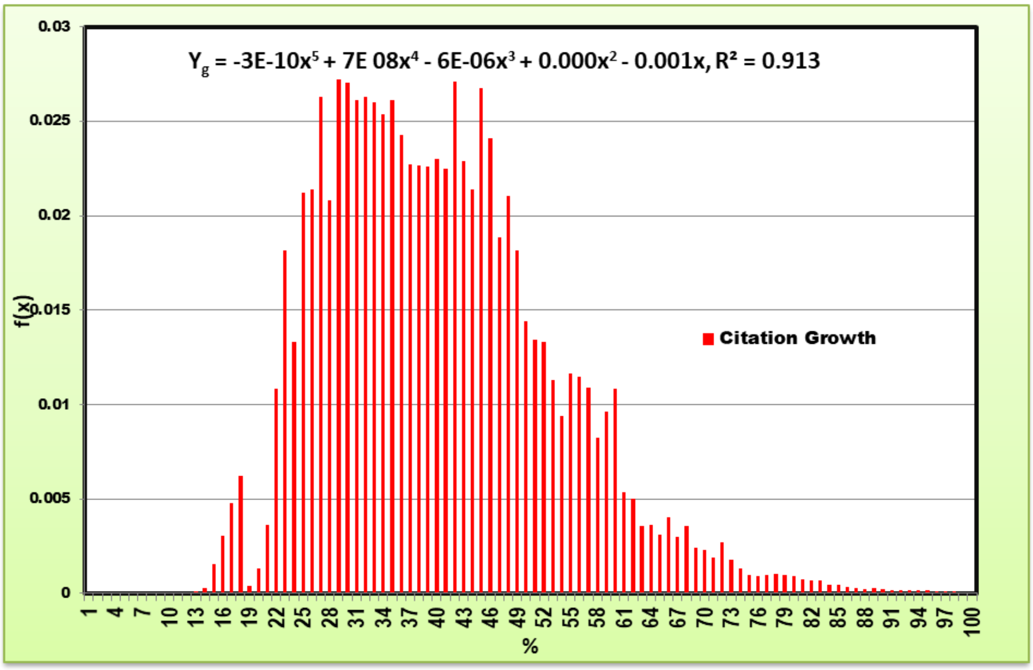

Figure 3 Simulated the growth of citations using the curve fitting method. To determine the relationship between two variables, a polynomial regression model of the fifth degree was fitted. According to the model, the growth of h_5 citations is linearly connected to a total of R2 = 91.30%

For each of the top hundred scholarly publications listed in (Table 1), citation data was taken from Google Scholar source. The null hypothesis was tested using exponential and binary logistic regression techniques, and R -statistical software was employed for the research. The h_5 citation score and Journal Impact Factor (JIF) were used to create the Metrics. According to the results, the Nature Review and Molecular Cell Biology ranked first (IF 113.9, h_5 155), followed by Nature Reviews Immunology (IF108.60, h_5-152), Circulation (IF 93.92, h_5 189) which came in third. The British Medical Journal (IF 93.33, h_5 190), the New England Journal of Medicine (IF91.24, h_5 432), Nature Medicine (IF87.24, h_5 235), the Lancet Infectious Diseases (IF 71.42 h_5 173), Nature Biotechnology (IF 68.16, $h_5$175), Nature Energy (IF 67.44, h_5 170) and Chemical Reviews (IF 61.55, h_5 265) came in fourth through tenth respectively. The journal impact factor helps authors to decide where to submit their articles, ranking of the journal is considered within the field of study, the Metrics of the table provides a consistent way of comparing journals on relative basis, most important and recent use of impact is in the process of academic evaluation. Top twenty research journal publications in various disciplines as determined by the h_5 citation (Table 2) , a total of eight discipline were characterized and simulated based on the citation score , logistic regression model was used to forecast the correlation between ranking, Health and Medical Sciences was highest ranking and significantly associated with citation (r = 0.91, R^2 % = 0.97); Physics and Mathematics (r = 0.89, R^2 % = 0.94); Engineering and Computer Science (r = 0.92, R^2 % = 0.85); Life Sciences and Earth Sciences (r = 0.90, R^2 % = 0.82); Chemical and Material Sciences (r = 0.88, R^2 % = 0.78); Social Sciences (correlation r=0.87, R^2 % = 0.77); Business, Economics and Management (r = 0.75; R^2 %= 0.56) and Humanities, Literature and Arts (r = 0.65; R^2 % = 0.42).

Table 2 Top twenty research journal publications across several disciplines, as determined by h5 citations

Ranking	**Regression Equation h_5-index** $Y_i = a + b\ln(X)$	**Correlation 'r'**	**R^2 (%)**
Top hundred publication in research journals			
Top journals with a cap of hundred globally	Y_i = 1786.42+398.11	0.91	0.84
Top twenty research journal publications only			
Health and Medical Sciences	Y_i = 2414.22 + 515.37	0.97	0.94
Physics and Mathematics	Y_i = 735.96 + 189.78	0.94	0.89
Engineering and Computer Science	Y_i = 2197.93 + 469.67	0.92	0.85
Life Sciences and Earth Sciences	Y_i = 1708.23 + 384.17	0.90	0.82
Chemical and Material Sciences	Y_i =1449.16 + 327.50	0.88	0.78
Social Sciences	Y_i = 484.6 + 137.311	0.87	0.77
Business, Economics and Management	Y_i = 685.36 + 183.58	0.75	0.56
Humanities, Literature and Arts	Y_i = 194.11 + 69.23	0.65	0.42

4. Discussion

The authors aimed to uphold academic standards and research integrity globally through the advancement of science and technology transfer, global citations, International Standard Serial Number (ISSN), online version, peer reviewed system, pure editorial board, indexing tools, Digital Object identifier (doi) number, plagiarism checking and less APC - article publication charge (Showkat Ahmed Wani *et al*., 2021; Emilio Delgado López-Cózar *et al*., 2012). In light of the aforementioned factors, the authors evaluated the global impact and growth of journals, and the concerned authority will determine the institution's ranking in the worldwide. Scientists are expected to make well-informed judgments about representative evidence of quality in their research papers on scientific norms established among peers. The analyses in the current study were built on the citation score and journal impact factor (Anne Wil Harzing *et al*., 2019). The above data Metrics show that during each evaluation cycle, the Google Scholar source or index tool for authored outputs was consistently employed[4].Even though some researchers' individual choices may have been limited, most researchers will have had the freedom to select their top journals based on global impact and citation score. National academic councils (UGC/ICAR/AICTE/NMC) and university authorities change the regularity guidelines from time to time in the interest of researchers. The most often submitted outputs were typically journal papers for the health and medical sciences, physics, and mathematics, indicating a strong submission mentality and sustaining high publication standards. In the era of digitization of scholarly publishing, opportunities for improving visibility of researchers and authors from any corner of the world are increasing rapidly. Online profiles are made possible by the indexing and long-term preservation of published journal articles and other scholarly works with assigned identifiers, such as the digital object identifier (doi) from Crossref. These profiles are crucial in the assessment of research performance over the course of an academic career (Caroline L Osborne *et al*., 2020). In an era where trashed journals are proliferating and adding articles at the price of quality, visibility, and citability, selecting the right target journals is crucial. Researchers should be taught how to manage their virtual or online profiles by highlighting their most valuable and well-known publications, as this may draw attention from both academics and the general public. Understanding the worth and applicability of the present evaluation metrics, which can be displayed on individual profiles by gathering data from different bibliographic databases, search engines, and social networking sites, is equally crucial. For author impact evaluations, Google Scholar author profiles are also processed, despite new information from comparative analyses that does not favors these platforms on feasibility and citation computation grounds [3-6]. In comparison to Scopus, Web of Science, the Science Citation Index, and the Social Science Citation Index. Google Scholar tracks a wide range of online journals, book chapters, conference papers, web pages, and pieces of grey literature to provide information about author citations (Armen Yuri Gasparyan *et al.,*2018; Anne Wil Harzing *et al*.,2009). Additionally, this search engine fails to identify and take into account low-quality and obviously "predatory" sources in bibliometric calculations. The present study demonstrated and formulated author level metrics and algorithms for the readers.

5. Conclusion

According to the current study, metrics help us to evaluate academic impact journals by providing evidence of h_5 citations across the globe. It enables scientists to join a large network and explore the online exposure of reputable publications. The most recent journal profiles are available from this salient metrics Google Scholar site and also it makes simple to navigate the journals extensive data, which includes the Impact factor and total h_5 citations. The influence of the research on a sizable audience is also shown by these metrics.

Compliance with ethical standards

Acknowledgments

We thank Google Scholar indexing services for providing online access to the extensive data sets. Without a doubt, we recognize that the KVAFSUS (B) authority has established a fantastic collections and Institutional depository for accessing research materials.

Disclosure of conflict of interest

The present study was based on secondary data and has no conflicts of interest with any funding organizations.

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