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Predictors of citations and altmetric scores in general surgery literature

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ABSTRACT

Objective: This study aimed to determine various article characteristics influencing the citations and altmetric scores using papers published in a year in four high-ranking surgery journals.

Material and Methods: We included all papers (n= 819 articles) published between January 2015 to December 2015 in the Annals of Surgery, British Journal of Surgery, JAMA Surgery and Journal of American College of Surgeons. Article characteristics were manually extracted. We determined citation count using the Web of Science database and used univariate analysis and negative binomial regression to determine which article characteristics affect citations and altmetric scores.

Results: Mean number of citations and altmetric score received by the article were 44.6 (0-475) and 19.2 (0-665) respectively. Majority of the articles contained at least one citation (98.3%) and altmetric score (98.2%). In regression analysis, citation count was significantly associated with the journal [Annals of Surgery (IRR= 1.93), JAMA surgery (IRR= 1.76)] and non-funded research (IRR= 0.83). The altmetric score was significantly associated with the country of the corresponding author (US) (IRR= 1.3), study subtopic, journal [JAMA surgery (IRR= 2.33)], non-funded (IRR= 0.74) and non-open-access publication (IRR= 0.44).

Conclusion: Article metrics were found to be associated with specific study subtopics, country of the corresponding author, funding, open-access publication and the journal. These results might help editors, reviewers and authors to produce, review and publish more impactful studies. A similar study in the future may help to better understand the changing dynamics of academic publishing.

Keywords: Citation count, altmetric attention score, bibliometrics, general surgery, negative binomial regression

INTRODUCTION

Medical research is the cornerstone of furthering medical knowledge, discovering new treatments, and improving the lives of patients, and requires a significant effort and expenditure of resources on the part of academic institutions, as well as their faculty and staff. While all research contributes to increasing the span of knowledge in medical science, quantifying the impact of an individual study is often a challenging task, which is traditionally done using citation count. The number of citations received by an article is often a surrogate of that article's scientific impact and importance (1). With the advent of open-access publishing and all the literature being made publicly available, a new metric called "Altmetrics" became popular to measure the "social" impact of the study. This could be seen as a surrogate for social media attention, dissemination and influence (2). Altmetric score is complementary to the citation count and both correlate well with each other (3).

Previous studies have tried to evaluate article characteristics associated with higher citation count in surgical subspecialties such as neurosurgery, urology, orthopaedics and plastic surgery (4-7). However, little is known about the factors predicting higher citation counts in general surgery. A study conducted by Mullins et al. has shown that manuscripts with higher citation counts in the general surgery literature are more likely to be clinical, collaborative, multi-institutional, and larger and more sample size (8). However, the sample size is smaller and prone to selection bias. In addition, to the best of our knowledge, article characteristics on which the altmetric score depend have not been evaluated in the general surgical literature.

This study aimed to determine various article characteristics which can influence citation count and altmetric attention score using papers published in a year in the four high-ranking general surgery journals. The results might help editors,

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reviewers and authors to produce, review and publish more impactful studies which may be important to the field.

MATERIAL and METHODS

Study Design and Data Collection

As the study did not involve human participants, research ethics committee approval was not applicable. We selected four top-ranked journals in "General Surgery" with high impact factors (IF) - The Annals of Surgery (AS) (IF 13.79), British Journal of Surgery (BJS) (IF 6.939), JAMA Surgery (IF 16.68) and Journal of American College of Surgeons (JACS) (6.532). These journals were chosen based on their importance in surgery according to the SCImago Journal Rank Indicator. We identified all research articles published in these journals during the one year between January 2015 to December 2015. Article types such as editorials and letters to editors were excluded, which yielded a total of 819 eligible studies.

In February 2022, after six hours of training in the use of the Web of Science (WoS) at the institute's library, the authors extracted the following article characteristics from each of the above-selected articles and entered manually in a spreadsheet software. Data on citation count and altmetric attention score were entered between February 6th to February 14th, 2022. We randomly selected 40 articles to confirm the accuracy of data collection.

The following data were extracted from each study:

1. Journal of publication (AS, BJS, JAMA Surgery, JACS)
2. Title of the study
3. Study design (experimental study, interventional, prospective cohort, retrospective cohort/case-control, cross-sectional study, case report/case series, systematic review/meta-analyses and guidelines)
4. Study subtopic
5. Number of characters in the title (excluding trailing or double spaces)
6. The month of publication (from January 2015 to December 2015)
7. Page count
8. Country of the corresponding author
9. Number of authors
10. Number of references
11. Whether any funding was received (Yes/No)
12. Whether the paper was Open Access (Yes/No).

Dependent variables:

13. Number of citations in WoS core collection
14. Altmetric attention score.

Statistical Analysis

We inserted data into a statistical database (SPSS, v.26.0, ©IBM Inc.) for analysis. Descriptive analysis was performed to quantitatively describe the features of the sample. Continuous variables were compared by independent t-test and analysis of variance (for normal distribution) for two or more than two groups respectively. Wilcoxon-rank sum test and Kruskal Wallis test were used for non-normal data - if the Shapiro-Wilk test was significant.

Regression: The mean of the number of citations, citations/year and the altmetric attention score was lower than their variance (overdispersion). Thus, the negative binomial regression model was used to determine the article characteristics which can affect the dependent variables. To transform the percentage of author self-citations into count data, we rounded off the percentage to the nearest whole number.

The analysis was performed on the entire study cohort. There were no missing values in the data set. All statistical tests were two-sided, and p values of less than 0.05 were considered to indicate statistical significance.

RESULTS

Article Characteristics

A total of 819 articles were analyzed. Characteristics of the included articles are shown in Table 1. Most of the studies belonged to the category of gastrointestinal surgery (54.0%). "Prospective cohort" was the most common study design (29.2%) closely followed by the 'retrospective cohort/case control' study (28.7%). Approximately a third of the studies were published in the AS (34.7%), and around half of the lead authors of the studies belonged to the United States (US) (48.4%). Most of the studies were not funded (57.1%) and were not open access (65.9%). Mean number of authors was 10 (5.7), mean character count in the title was 108.1 (35.5), mean page count was 8.1 (2.2), and mean reference count was 32.7 (17.7).

Mean number of citations received by the article in the WoS core collection were 44.6 (range 0-475). Mean altmetric attention score was 19.2 (0-665). The overwhelming majority of articles contained at least one citation (98.3%) and altmetric attention score (98.2%) respectively.

Univariate Analysis

In univariate analysis, study design, study subtopic, journal of publication, funded research, character count, reference count and the number of authors were statistically significantly associated with the number of citations. The altmetric attention score was statistically significantly associated with the study subtopic, the journal of publication, the country of the corresponding author, funded research and if the paper was open access (Table 2).

Table 1. Article characteristics

Variable	n (%)
Study Design	
• Experimental Study	18 (2.2)
• Interventional	91 (11.1)
• Prospective Cohort	239 (29.2)
• Retrospective Cohort/Case Control	235 (28.7)
• Cross Sectional	35 (4.3)
• Case Report/Case Series	39 (4.8)
• Systematic Review/Meta-Analyses	158 (19.3)
• Guidelines	4 (0.5)
Clinical Category	
• Basic Science and Statistics	49 (6.0)
• Cardiothoracic and Vascular Surgery	21 (2.6)
• Endocrine Surgery	24 (2.9)
• Gastrointestinal Surgery	442 (54.0)
• Gynaecological Surgery	3 (0.4)
• Obesity	5 (0.6)
• Burns and Plastic Surgery	11 (1.3)
• Urologic Surgery	17 (2.1)
• Surgical Infections	7 (0.9)
• Trauma and Critical Care	54 (6.6)
• Vascular Surgery	46 (5.6)
• Miscellaneous	89 (10.9)
• Breast	47 (5.7)
• Orthopaedics	4 (0.5)
Journal	
• Annals of Surgery	284 (34.7)
• JAMA Surgery	198 (24.2)
• British Journal of Surgery	130 (15.9)
• Journal of American College of Surgeons	207 (25.3)
Country of Lead Author	
• Australia	10 (1.2)
• Canada	28 (3.4)
• USA	396 (48.4)
• UK	103 (12.6)
• France/Germany/Netherlands/Italy	120 (14.7)
. [#]Others	162 (19.8)
Country of Corresponding Author	
• Australia	10 (1.2)
• Canada	28 (3.4)
• USA	406 (49.6)
• UK	99 (12.1)
• France/Germany/Netherlands/Italy	119 (14.5)
. [#]Others	157 (19.2)

Table 1. Article characteristics (continue)

Variable	n (%)
Month of Publication	
• January	74 (9.0)
• February	61 (7.4)
• March	64 (7.8)
• April	83 (10.1)
• May	71 (8.7)
• June	79 (9.6)
• July	66 (8.1)
• August	88 (10.7)
• September	55 (6.7)
• October	50 (6.1)
• November	61 (7.4)
• December	67 (8.2)
Funding	
• Yes	351 (42.9)
• No	468 (57.1)
Open Access	
• Yes	279 (34.1)
• No	540 (65.9)
Character Count	108.12 ± 35.54
Page Count	8.13 ± 2.23
Reference Count	32.69 ± 17.66
Number of Authors	10.02 ± 5.78

*Plus-minus values mean ± SD. The number in parenthesis denotes percentages.
[#]Denote these countries: Brazil, Belgium, Sweden, Spain, South Korea, Denmark, China, Japan, Switzerland, India, Egypt, Greece, Ireland, Türkiye, New Zealand, Norway, Portugal, Singapore, Taiwan.

Regression Analysis

The variance inflation factor for each variable included in the regression model was <5. Thus, there was no multicollinearity and all the statistically significant variables in univariate analysis were put in the regression model. The results are shown in Table 3. Adjusted analysis showed that the study design was not statistically significantly associated with the citation count. Under the study subtopic, endocrine surgery, cardiothoracic surgery and plastic surgery were negatively associated with the altmetric score [incidence rate ratio (IRR= 0.21, 0.29, 0.19 respectively)]. "AS" was statistically significantly associated with the number of citations (IRR= 1.93) and the "JAMA surgery" was statistically significantly associated with both the number of citations and the altmetric attention score (IRR= 1.76, 2.33 respectively).

Table 2. Univariate analysis: Median citations and altmetric attention score by article characteristics

Characteristic	Median Citations (IQR)	p	Median Altmetric (IQR)	p
Study Design				
Experimental Study	24.00 (8.50-35.00)	0.003	7.00 (1.00-9.50)	0.48
Interventional	25.00 (12.00-42.00)		6.00 (3.00-17.00)	
Prospective Cohort	32.00 (16.00-54.00)		5.00 (2.00-13.00)	
Retrospective Cohort/Case Control	30.00 (16.00-59.00)		8.00 (3.00-21.00)	
Cross Sectional	21.00 (12.00-48.00)		5.00 (2.00-16.00)	
Case Report/Case Series	14.00 (1.00-59.00)		5.00 (2.00-7.00)	
Systematic Review/Meta-Analyses	35.00 (19.00-59.00)		6.00 (3.00-14.00)	
Guidelines	34.50 (13.50-80.25)		6.00 (2.00-8.50)	
Study sub-Topic				
Basic Science and Statistics	34.00 (20.00-83.00)	0.001	17.00 (7.00-32.00)	<0.001
Cardiothoracic and Vascular Surgery	21.00 (12.00-49.00)		5.00 (2.00-18.00)	
Endocrine Surgery	25.00 (12.25-45.00)		2.00 (1.00-7.75)	
Gastrointestinal Surgery	34.00 (16.75-62.00)		6.00 (3.00-12.00)	
Gynaecological Surgery	35.00 (N/A)		30.00 (N/A)	
Obesity	85.00 (44.00-97.00)		34.00 (30.00-97.00)	
Burns and Plastic Surgery	30.00 (23.00-46.00)		5.00 (1.00-8.00)	
Urologic Surgery	22.00 (6.00-59.00)		7.00 (2.50-31.50)	
Surgical Infections	26.00 (16.00-47.00)		10.00 (2.00-26.00)	
Trauma and Critical Care	21.50 (10.75-31.50)		6.50 (3.00-28.25)	
Vascular Surgery	34.00 (16.00-55.25)		4.50 (2.00-11.50)	
Miscellaneous	23.00 (13.50-40.50)		9.00 (3.00-25.50)	
Breast	20.00 (12.00-49.00)		4.00 (2.00-17.00)	
Orthopaedics	34.00 (25.50-52.25)		49.00 (14.00-97.50)	
Journal				
Annals of Surgery	37.00 (20.00-73.00)	<0.001	6.00 (3.00-13.00)	<0.001
JAMA Surgery	31.00 (16.00-59.00)		24.50 (10.00-54.00)	
British Journal of Surgery	29.00 (13.00-49.00)		5.00 (2.00-10.00)	
Journal of American College of Surgeons	23.00 (12.00-41.00)		3.00 (2.00-8.00)	
Country of Lead Author				
Australia	34.50 (24.25-58.75)	0.195	7.00 (4.75-12.75)	<0.001
Canada	33.00 (17.00-57.00)		9.50 (5.25-21.75)	
USA	28.00 (13.00-54.00)		7.00 (3.00-25.00)	
UK	29.00 (19.00-52.00)		8.00 (3.00-17.00)	
France/Germany/Netherlands/Italy	37.50 (20.00-63.25)		5.00 (2.00-8.00)	
[#]Others	31.50 (15.00-59.00)		5.00 (2.00-10.25)	

Table 2. Univariate analysis: Median citations and altmetric attention score by article characteristics (continue)

Characteristic	Median Citations (IQR)	p	Median Altmetric (IQR)	p
Month of Publication				
January	32.50 (16.00-74.00)	0.148	5.00 (2.00-27.25)	0.177
February	39.00 (18.00-78.00)		6.00 (2.00-15.00)	
March	36.00 (16.00-62.75)		6.00 (2.00-16.75)	
April	27.00 (14.00-51.00)		5.00 (2.00-15.00)	
May	42.00 (19.00-71.00)		8.00 (5.00-21.00)	
June	29.00 (13.00-48.00)		6.00 (3.00-13.00)	
July	28.50 (14.75-53.00)		6.50 (3.00-11.25)	
August	27.00 (12.25-49.00)		5.00 (2.25-18.75)	
September	25.00 (12.00-49.00)		6.00 (3.00-24.00)	
October	30.00 (15.50-60.25)		5.50 (2.00-16.25)	
November	26.00 (14.50-49.50)		5.00 (2.50-10.00)	
December	31.00 (16.00-54.00)		6.00 (3.00-15.00)	
Funding				
Yes	33.00 (19.00-59.00)	0.004	7.00 (3.00-18.00)	0.003
No	28.00 (13.00-54.00)		5.00 (3.00-13.00)	
Open Access				
Yes	32.00 (15.00-59.00)	0.305	10.00 (4.00-33.00)	<0.001
No	30.00 (15.00-53.00)		5.00 (2.00-10.00)	
Character Count	(0.090)	0.010	-0.072	0.039
Page Count	0.168	<0.001	-0.050	0.151
Reference Count	0.216	<0.001	0.032	0.367
Number of Authors	0.192	<0.001	0.066	0.058

#Denote these countries: Brazil, Belgium, Sweden, Spain, South Korea, Denmark, China, Japan, Switzerland, India, Egypt, Greece, Ireland, Türkiye, New Zealand, Norway, Portugal, Singapore, Taiwan.

Table 3. Negative binomial regression IRR for the outcomes

Variable	Citations	Altmetric Score
Study Design		
Experimental Study	0.65 (0.21-1.97)	
Interventional	0.91 (0.33-2.54)	
Prospective Cohort	1.17 (0.42-3.22)	
Retrospective Cohort/Case Control	1.17 (0.43-3.23)	
Cross Sectional	0.92 (0.32-2.67)	
Case Report/Case Series	0.74 (0.26-2.13)	
Systematic Review/Meta-Analyses	1.09 (0.39-3.02)	
Guidelines	1	
Clinical Category		
Basic Science and Statistics	1.63 (0.56-4.72)	1.20 (0.40-3.58)
Cardiothoracic and Vascular Surgery	0.78 (0.26-2.37)	0.29 (0.09-0.88)
Endocrine Surgery	1.33 (0.44-4.03)	0.21 (0.07-0.67)
Gastrointestinal Surgery	1.44 (0.52-4.02)	0.46 (0.16-1.29)

Table 3. Negative binomial regression IRR for the outcomes (continue)

Variable	Citations	Altmetric Score
Gynaecological Surgery	0.98 (0.21-4.61)	0.63 (0.13-3.04)
Obesity	1.56 (0.40-6.00)	2.10 (0.53-8.28)
Burns and Plastic Surgery	0.93 (0.28-3.09)	0.19 (0.05-0.64)
Urologic Surgery	1.06 (0.34-3.28)	0.30 (0.10-0.94)
Surgical Infections	1.16 (0.33-4.08)	0.41 (0.11-1.52)
Trauma and Critical Care	0.76 (0.26-2.20)	0.85 (0.28-2.51)
Vascular Surgery	1.19 (0.41-3.44)	0.35 (0.12-1.06)
Miscellaneous	0.92 (0.33-2.62)	0.49 (0.17-1.42)
Breast	1.26 (0.44-3.64)	0.57 (0.19-1.69)
Orthopaedics	1	1
Journal		
Annals of Surgery	1.93 (1.56-2.38)	1.16 (0.94-1.44)
JAMA Surgery	1.76 (1.36-2.27)	2.33 (1.80-3.01)
British Journal of Surgery	1.09 (0.87-1.36)	1.03 (0.78-1.36)
Journal of American College of Surgeons	1	1
Country of Lead Author		
Australia		0.83 (0.41-1.67)
Canada		1.41 (0.90-2.23)
USA		1.28 (1.02-1.62)
UK		1.21 (0.90-1.62)
France/Germany/Netherlands/Italy		0.70 (0.54-0.91)
#Others		1
Funding		
No	0.83 (0.72-0.96)	0.74 (0.63-0.87)
Yes	1	1
Open Access		
No		0.44 (0.37-0.53)
Yes		1
Variable	**Citations**	**Altmetric Score**
Character Count	1.00 (0.99-1.00)	0.99 (0.994-0.999)
Page Count	1.11 (1.06-1.17)	
Reference Count	1.01 (0.999-1.00)	
Number of Authors	0.99 (0.985-1.01)	

*IRR stands for incidence rate ratios. Values in the table are expressed as IRR (95% confidence interval).

#Denote these countries: Brazil, Belgium, Sweden, Spain, South Korea, Denmark, China, Japan, Switzerland, India, Egypt, Greece, Ireland, Türkiye, New Zealand, Norway, Portugal, Singapore, Taiwan.

The altmetric score was statistically significantly higher when the corresponding author belonged to the US (IRR= 1.3). Non-funded research was negatively associated with both citation counts and altmetric attention scores (IRR= 0.83, 0.74 respectively). Non-open access publication was negatively associated with the altmetric attention score (IRR= 0.44). Page count and the number of references were both borderlines positively associated with the number of citations.

DISCUSSION

In this study, we evaluated what article characteristics could affect citation rates and altmetric attention score in high-ranked general surgery literature. We found that the study design was not associated with higher citation counts or altmetric attention scores. Earlier studies evaluating the effect of study design on citation rates have been mixed. While some studies based on orthopaedics or urology indicate that

randomized trials and systematic reviews are associated with higher citation counts, other studies based on plastic surgery and emergency medicine fail to do so (5,7,9,10). However, the literature on the effect of study design on altmetric scores is sparse. Puzas et al. have evaluated 840 articles in dermatology and found that journal type, presence of conflicts of interest and open-access articles are associated with higher altmetric attention scores (11).

Surgical sub-fields such as endocrine surgery, cardiothoracic, vascular surgery and burns, plastic surgery were found to be significantly negatively associated with altmetric scores when compared to orthopaedic surgery. This could be due to a higher prevalence of certain diseases and/or more familiarity with particular fields to the people. Publication in AS was significantly associated with higher citation rates, and publication in JAMA Surgery was strongly associated with both higher citation rates and altmetric scores. This is expected given the fact that JAMA surgery has the highest impact factor among all surgical journals in the world (12). IF is a measure of the average number of citations received by the article in time. It is intuitive, therefore, that IF correlates well with citation counts. Moreover, there is enough evidence that across medical and surgical specialities, altmetric scores correlate well with citation counts (3).

US authors emerged as a significant predictor of higher altmetric scores in adjusted analysis. The reasons for this observation could be many. The US currently leads the world's medical research output (13,14). This is largely in part due to high research funding and a diverse scientific community. In addition, most of the top-ranked journals have emerged from the US. American authors and reviewers are biased towards the articles published locally which can falsely amplify article metrics (15,16). Moreover, studies indicate that even among top journals, papers published by high-income countries gather more metrics than low and middle-income countries (17).

Funded research also emerged as a significant predictor of higher citation counts and altmetric scores. Non-funded articles roughly received 20% fewer citations and had 25% lower altmetric scores than the funded articles independent of the study subtopic and study design in adjusted analysis. A study conducted by Mosleh et al. shows that funded projects receive more citations than non-funded ones across life sciences (18). This indicates that funded projects have more visibility on social media and in the research community and are seen as a marker of quality. Thus, funding agencies should judiciously use resources to allocate funds to impactful studies. We also found that open-access publications have significantly higher altmetric scores than non-open access publications by nearly 2.2 folds. However, similar results were not obtained with citation counts. This has been seen in studies conducted in orthopaedic and otolaryngology literature as well (19,20). With the advent and popularity of "Scihub" and "Libgen" however, which provides free access to nearly 85% of the paywalled literature, the results could be significantly distorted as the majority of the medical literature may be 'open access' (21).

We used a robust methodology in this study. We used a large sample size and included both the traditional measure of scientific impact i.e. citation counts and more contemporary social media indicators of scientific impact i.e. altmetric attention scores to determine which article characteristics can affect these measures. The results could be helpful to journal editors, reviewers and authors to predict and invest time and resources to the papers which may have high impact in the field. We chose four journals with the highest impact factors. Since these journals are widely read by both the "experts" and the public, the results are more generalizable to the general surgery literature. We used a window of seven years post-publication to adequately capture the number of citations and altmetric scores.

This study has limitations. We used a retrospective observational design which can potentially generate confounding. In addition, there is a recent trend towards more collaborative research and the increased publication of systematic reviews and randomized trials and a relatively lower preference towards qualitative studies (22,23). Thus, the results might differ if the study is done in the future. It will be useful, therefore, to perform a similar study at a future time point to better understand the changing dynamics of the academic publishing. Similarly, the inclusion of smaller or more specialized journals may alter the results. However, we believe that the chosen journals have a broad readership and widely cover the subspeciality subtopics. We used WoS core collection for the citations. The results may vary if other databases are used including Google Scholar or Scopus which have been shown to have higher citation counts than WoS (24).

CONCLUSION

Article metrics were improved with specific study subtopics, when the author belonged to the US, when the research was funded, open access or published in a journal with higher impact factor. The results might help editors, reviewers and authors to produce, review and publish more impactful studies. Similar studies at a future time point will help to better understand the changing dynamics of the academic publishing.

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Genel cerrahi literatüründe atıfların ve altmetrik puanlarının belirleyicileri

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ÖZET

Giriş ve Amaç: Bu çalışmanın amacı, dört üst düzey cerrahi dergisinde bir yılda yayımlanan makaleleri kullanarak, alıntıları ve altmetrik puanları etkileyen çeşitli makale özelliklerini belirlemektir.

Gereç ve Yöntem: Ocak 2015-Aralık 2015 tarihleri arasında Annals of Surgery, British Journal of Surgery, JAMA Surgery ve Journal of American College of Surgeons dergilerinde yayımlanan tüm makaleler (n= 819 makale) dahil edildi. Makale özellikleri manuel olarak çıkarıldı. Alıntı sayısını belirlemek için Web of Science veri tabanı kullanıldı ve hangi makale özelliklerinin alıntıları ve altmetrik puanları etkilediğini belirlemek için tek değişkenli analiz ve negatif binom regresyon uygulandı.

Bulgular: Makale tarafından alınan ortalama alıntı sayısı ve altmetrik puan sırasıyla 44,6 (0-475) ve 19,2 (0-665) idi. Makalelerin çoğu en az bir alıntı (%98,3) ve altmetrik puan (%98,2) içeriyordu. Regresyon analizinde atıf sayısı dergi [Annals of Surgery (IRR= 1.93), JAMA Surgery (IRR= 1,76)] ve finanse edilmeyen araştırma (IRR= 0,83) ile anlamlı şekilde ilişkiliydi. Altmetrik puan ise ülke ile anlamlı bir şekilde ilişkiliydi. İlgili yazar (ABD) (IRR= 1,3), çalışma alt konusu, dergi [JAMA Surgery (IRR= 2,33)], finanse edilmeyen (IRR= 0,74) ve açık erişim olmayan yayın (IRR= 0,44) ile ilişkiliydi.

Sonuç: Makale ölçümleri; belirli çalışma alt konuları, ilgili yazarın ülkesi, finansman durumu, açık erişimli yayın ve dergi ile ilişkilendirildi. Bu sonuçlar editörlerin, hakemlerin ve yazarların daha etkili çalışmalar üretmesine, incelemesine ve yayımlamasına yardımcı olabilir. Gelecekte benzer bir çalışma, akademik yayıncılığın değişen dinamiklerinin daha iyi anlaşılmasına katkıda bulunabilir.

Anahtar Kelimeler: Atıf sayısı, altmetrik dikkat puanı, bibliyometri, genel cerrahi, negatif binom regresyonu

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