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SCIENTOMETRIC ANALYSIS OF THE AMERICAN JOURNAL OF CLINICAL NUTRITION: A STUDY

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ABSTRACT

The Present study examines the publication output of The American Journal of Clinical Nutrition. . which published 4203 articles were published during the study period, with more number articles published in 2011 523(12.5. and Most productivity of Top Fifteen Institutions that Harvard university is rank first in the most productive institutions published a maximum number is 313(7.4%). Country-wise distribution The United States of America is the first place for producing 2132 records. The most productive authors the most prolific authors were ranked according to publications count. Hu FB produces a high number of articles 91 is found among the contributions. Zipf's law the words-wise distribution of the top fifteen keywords are used respectively. The highest time the Risk keyword is using 617(14.7%). the number of cited documents year-wise distribution. The degree of collaboration in AJCN ranged f 0.88 which collaborative works are remarkably observed.The result has pointed out the merits and weaknesses of the journal which can be helpful for its further development.

KEYWORDS: Scientometrics, American journal, Clinical Nutrition, Zip law, Productive Author, Degree of collaboration.

INTRODUCTION

The origin of the term 'Scientometrics' goes back to the year 1969, the two Russian scientists Nalimov and Mulechenko coined the Russian term 'naukometriya' the Russian equivalent of scientometrics. Dobrev and karennoi from Russia were the first t coin the term

scientometrics. ‘Scientometrics’ encompasses all quantitative aspects and models related to the production and distribution of scientific and technological knowledge, scientometrics may be treated as an analogous concept to bibliometrics. It was practiced in East European countries, especially in Hungary, for the quantification of science at the individual, institutional, and even international levels. The science citation index (SCI) spawned the field of scientometrics. This term came into eminence with the dawn of the journal named ‘scientometrics’ by T.Braunin in 1977, initially published in Hungary and presently from Amsterdam.

This term came into prominence with the founding of the journal named ‘scientometrics’ by T, Braunin in 1977, originally published in Hungary and currently from Amsterdam. Scientometrics used to mean communication process in science including socio-cultural aspects and appears to be almost synonymous with science of science with more stress on its quantitative aspects. It is also used as a generic term for a system by using a variety of approaches within the area of science and technology studies, Merton and Garfield (1987)28 have defined it as a field of inquiry given over to the quantitative analysis of science and science and scientific field.

American Journal of Clinical Nutrition

The American Journal of Clinical Nutrition is a monthly peer-reviewed biomedical journal in the field of clinical nutrition.

The journal was established in 1952 as the Journal of Clinical Nutrition, edited by S.O. Waife, and published by the Nutrition Press. It was continued in series under the present title from 1954 and was published by the American Society for Clinical Nutrition (ASCN). It is now published by the American Society for Nutrition. As of June 2009, the journal's editor-in-chief is Dennis M. Bier (Baylor College of Medicine).

The purpose of The American Journal of Clinical Nutrition (AJCN) is to publish original research studies relevant to human and clinical nutrition. Well-controlled clinical studies that describe scientific mechanisms, efficacy, and safety of dietary interventions in the context of disease prevention or a health benefit will be considered. Public health and epidemiologic studies relevant to human nutrition, and innovative investigations of nutritional questions that employ epigenetic, genomic, proteomic, and Metabolomic approaches are encouraged. Solicited editorials, book reviews, solicited or unsolicited review articles, invited

controversial position papers, and letters to the Editor that relate to prior AJCN articles are essential components of the AJCN. All submitted material with scientific content will undergo peer review by the Editors or their designees before acceptance for publication.

- Publisher American Society for Nutrition (United States)
- Discipline Nutrition
- Language English
- History 1952-present
- Frequency Monthly
- Impact factor 6.926 (2016)
- Edited by Dennis M. Bier
- ISSN 0002-9165(print), 1938-3207(web)

REVIEW OF LITERATURE

Abdi, A., Idris, N., Alguliyev, R. M., &Aliguliyev, R. M. (2018) this study aims to present a bibliometric analysis of the journal titled "Information Processing & Management (IP & M)" for the period from 1980 to 2015. The present study was conducted with an aim to provide a summary of research activity in current journal and characterize its most important aspects. The analysis covers mainly the year-wise distribution of articles, category-wise classification of papers, authorship patterns of papers, degree of collaboration, most prolific contributions of papers, institutions-wise distribution of contributions, geographical distribution of papers, and citation analysis of the IP&M journal. The analysis showed that 2,913 papers were published in journal of IP&M from 1980 to 2015. The highest percentage was articles (67.15%) among the published document types. In this study, we have identified top 10 prolific authors, top 10 institutions and top 24 prolific countries with number of papers. Researchers from USA have been made the most percentage of contributions (50.88%). We have also identified that from the period 1980-1985 to the period 2010-2015 degree of collaboration has been increased in 3 times. All the studies demonstrate the merits and weakness of the journal which will be helpful for its further development.**Bakri, A., & Willett, P. (2017)** this paper analyses publication and citation patterns in the Malaysian Journal of Library and Information Science (MJLIS) from 2001-2006, and compares the results with those obtained in an earlier study by Tiew et al. (2002) covering the period 1996-2000. Our results show that the number of publications has increased from the 76 articles in the Tiew study to 85 articles here, with statistically significant changes in the types of article, in the numbers of references per article and in the lengths of the articles. The complete set of

161 articles attracted a total of 87 citations, 52 of which were self-citations, with 14% of the MJLIS articles having been cited at least once.**Niu,J., et al (2016)** has evaluated the publications made based on artificial intelligence during a period 1990 – 2014 by analyzing bibliometrically. Science Citation Index Expanded and Conference Proceeding Citation Index – Science is used for data collection. The analyses that United States has the top institutions that researches about artificial intelligence. Similarly USA produces single country and collaborative articles. They also conclude that their study will be a great assistance foe applications of AI in various fields of research worldwide.**Sankar, P., & Kavitha, E. S. (2015)** Any librarian in this field will need to continue not only filling these roles, but also ensuring that they themselves are part of the conversation as it moves forward and staying up-to-date with developments within this area. The concept of library involvement pertaining to metrics did not originate with altmetrics. Impact Factor was originally created primarily for use by librarians in making collection development and retention decisions. Libraries continue to bear primary responsibility for the acquisition of bibliometrics tools, most notably Web of Science, Journal Citation Reports, and Scopus, as well as the training of people in their use. As a result, librarians are already familiar with providing support for these tools, so it makes sense that librarians have expanded to support the variety of altmetrics sources and tools. Additionally, librarians serve as natural leaders when it comes to altmetrics, not only due to familiarity with resources, but also because of the relationships they maintain with several disparate groups. The article detailed about the various tools, section, evaluation methods in which libraries and librarians are supporting and interacting with altmetrics.

METHODOLOGY

Bibliometric details of a Journal of American journal of clinical nutrition for collection of data from Web of Science bibliographic database which is published by Thomson Reuters (WOS). The study covered the ten-year time span from 2010 to 2019, a total of 4203 records were retrieved in the present study. The required data were collected data from the Web of Science database analyzes through Histcite and calculated using Excel to find out the result.

OBJECTIVES OF THE STUDY

The given below the main objectives of this study,

- To determine the year wise publication of records
- To find out the Relative growth rate(RGR) and Doubling time
- To identify the language wise distribution of records

- To determine the document type wise distribution of the records
- To analyzes the authorship pattern and author productivity
- To calculate the degree of collaboration (DC)
- To find out the most prolific authors
- To identify the country wise distribution of publications
- To find out the average of keywords
- To analysis the Single author Vs Multi author
- To determine the growth of literature of time series

Analysis and Interpretation Data

Table 1: Year wise distribution.

S.NO	Publication Year	Records	Percent	TLCS	TGCS
1	2010	493	11.7	1029	30175
2	2011	523	12.5	910	24912
3	2012	435	10.3	705	19257
4	2013	430	10.2	631	16615
5	2014	436	10.4	626	14651
6	2015	406	9.7	401	9546
7	2016	420	10	383	7423
8	2017	437	10.4	366	4721
9	2018	313	7.4	103	1160
10	2019	310	7.4	132	345
Total		4203	100	5286	128805

Table 1 To analyses the yearly output on American journal of clinical nutrition from 2010 to 2019. These are about 4203 total output on American journal of clinical nutrition in the last ten years. In the year 2011, the output measured is 523(12.5%); this is the highest records out of 4203 records. In the year 2019, the output measured is 310(7.4%); this is the lowest records out of 4203 records. The study includes the data covered in the web of science database from 2010 to 2019.

Table 2: Document types of publication.

S.NO	Document Type	Records	Percent	TLCS	TGCS
1	Article	2865	68.2	4342	106930
2	Letter	520	12.4	64	802
3	Editorial Material	329	7.8	120	1691
4	Article; Proceedings Paper	212	5.0	409	11011
5	Review	159	3.8	345	8252
6	Correction	111	2.6	3	43
7	Biographical-Item	5	0.1	0	3

8	Article; Retracted Publication	1	0.0	3	73
9	Book Review	1	0.0	0	0
Total		4203	99.9	5286	128805

Table 2 indicates document wise distribution of American journal of clinical nutrition. There are about 9 items of publications in the study. The Articles observed in 2865(68.2%) records on out of4203records. Followed by the form of Review got the second position among the 9 items. It has shows and 520(12.4%) records of the study period. The other preferred forms followed by the study are Article, Review, Editorial Material, Proceeding Paper, Letter, Book Review, News Item, Book Chapter, Correction, Data paper, Biographical item, Reprint and Retraction the period of study.

Table 3: Language wise publication.

S.NO	Language	Records	Percent	TLCS	TGCS
1	English	4203	100.0	5286	128805
Total		4203	100.0	5286	128805

Table 3 Shows that language wise distribution of journal of "American journal of clinical nutrition" research during the period of 2010-2019. The journal distributed only in English language was total records 4203 (100.0%).

Table 4: Institution wise (top 15).

S. No	Institution	Records	Percent	TLCS	TGCS
1	Harvard Univ	313	7.4	658	17142
2	Brigham &Women's Hosp	211	5.0	387	9261
3	Tufts Univ	160	3.8	256	4814
4	Univ Copenhagen	144	3.4	237	4092
5	Maastricht Univ	107	2.5	146	3538
6	Unknown	107	2.5	3	43
7	Univ Oxford	95	2.3	149	3471
8	Univ Minnesota	92	2.2	170	2914
9	Univ Calif Davis	91	2.2	174	2900
10	Wageningen Univ	90	2.1	172	4173
11	Harvard Med Sch	88	2.1	52	748
12	Univ Cambridge	87	2.1	110	2985
13	Univ Toronto	85	2.0	129	2542
14	Baylor Coll Med	83	2.0	84	1824
15	Univ Washington	83	2.0	168	2651

Table 4 shows that only top fifteen institutions which are ranked the research productivity of areas. On the total number of institutions observed is 4203. It is noted that Harvard university

is rank first in the most productive institutions published a maximum number is 313(7.4%). Which is followed by 211(5.0%) to got the second rank in the period of study.

Table 5: Country wise (top 15).

S.NO	Country	Records	Percent	TLCS	TGCS
1	USA	2132	50.7	3020	66687
2	UK	712	16.9	1128	28570
3	Netherlands	402	9.6	532	13747
4	Australia	297	7.1	456	9627
5	Canada	286	6.8	354	8060
6	Germany	244	5.8	361	9800
7	Denmark	238	5.7	394	7680
8	France	216	5.1	309	8765
9	Sweden	185	4.4	258	6414
10	Spain	181	4.3	186	7195
11	Italy	165	3.9	199	6650
12	Peoples R China	165	3.9	174	3953
13	Switzerland	142	3.4	237	6104
14	Unknown	138	3.3	15	428
15	Norway	133	3.2	196	4513

Table 5 shows that country wise distribution of publications output on American journal of clinical nutrition, the total observed in the study is 4203 during the period 2010 - 2019. The analyses bring out the fact that the considered to be the first and it has given the producing of 2132(50.7%) records on American journal of clinical nutrition and the USA is considered to the most productive country is brought out research.. The second rank is UK. This has brought out 712(16.9%) publications on American journal of clinical nutrition. The third rank to Netherlands. It has produced the 402(9.6%) publications output.

Table 6: Top (15) most productive author.

S.NO	Author	Records	Percent	TLCS	TGCS
1	Hu FB	91	2.2	211	6103
2	Willett WC	75	1.8	179	4180
3	Rimm EB	48	1.1	111	2449
4	Astrup A	47	1.1	104	1759
5	Khaw KT	47	1.1	78	1874
6	Tjonneland A	44	1.0	85	1930
7	Boeing H	43	1.0	104	2320
8	Overvad K	42	1.0	83	1838
9	Wareham NJ	39	0.9	84	2045
10	Tumino R	36	0.9	75	1779
11	Trichopoulou A	35	0.8	54	1659
12	Riboli E	34	0.8	61	1577

13	Mozaffarian D	33	0.8	99	1784
14	Manson JE	32	0.8	54	1234
15	Bueno-De-Mesquita HB	30	0.7	45	1442

Table 6 shows that the top fifteen authors for the research purpose. We observed the majority of author is Hu FB published in 91(2.2%) records to first position, followed by the Willett WC and Rimm EB published in 75(1.8%) records to second position. And Bueno- De-Mesquita HB published in 30(0.7%) in the lowest position.

Table 7: Zipf's law (frequency of keyword).

S.NO	Word	Records	Percent	TLCS	TGCS
1	RISK	617	14.7	840	20448
2	INTAKE	604	14.4	822	17990
3	RANDOMIZED	595	14.2	900	20818
4	DIETARY	543	12.9	708	17122
5	TRIAL	511	12.2	732	16079
6	CONTROLLED	439	10.4	650	15833
7	WOMEN	354	8.4	512	10969
8	VITAMIN	342	8.1	450	10386
9	WEIGHT	322	7.7	362	11409
10	EFFECTS	308	7.3	466	11069
11	CHILDREN	292	6.9	341	9471
12	ANALYSIS	279	6.6	567	16108
13	ADULTS	268	6.4	454	11626
14	CONSUMPTION	265	6.3	469	10243
15	SUPPLEMENTATION	262	6.2	338	8466

Table 7 The words wise distribution of top fifteen keywords are using respectively. The highest time the Risk keyword is using 617(14.7%) out of 4203 records. The second time keyword intake is using 604(14.4%) out of 4203 records the study period of publications.

Table 8: Top (15) highly cited reference.

S.No	Author / Year / Journal	Records	Percent
1	MATTHEWS DR, 1985, DIABETOLOGIA, V28, P412, DOI 10.1007/BF00280883	110	2.6
2	Willett WC, 1998, NUTR EPIDEMIOLOGY	100	2.4
3	Willett WC, 1997, AM J CLIN NUTR, V65, P1220, DOI 10.1093/ajcn/65.4.1220S	93	2.2
4	FRIEDEWALD WT, 1972, CLIN CHEM, V18, P499	84	2.0
5	WILLETT WC, 1985, AM J EPIDEMIOL, V122, P51, DOI 10.1093/oxfordjournals.aje.a114086	82	2.0
6	RIMM EB, 1992, AM J EPIDEMIOL, V135, P1114, DOI 10.1093/oxfordjournals.aje.a116211	73	1.7
7	Hu FB, 1999, AM J EPIDEMIOL, V149, P531, DOI	72	1.7

	10.1093/oxfordjournals.aje.a009849		
8	Egger M, 1997, BMJ-BRIT MED J, V315, P629, DOI 10.1136/bmj.315.7109.629	71	1.7
9	SALVINI S, 1989, INT J EPIDEMIOL, V18, P858, DOI 10.1093/ije/18.4.858	68	1.6
10	WILLETT W, 1986, AM J EPIDEMIOL, V124, P17, DOI 10.1093/oxfordjournals.aje.a114366	66	1.6
11	DERSIMONIAN R, 1986, CONTROL CLIN TRIALS, V7, P177, DOI 10.1016/0197-2456(86)90046-2	64	1.5
12	Estruch R, 2013, NEW ENGL J MED, V368, P1279, DOI 10.1056/NEJMoa1200303	62	1.5
13	World Cancer Research Fund, 2007, FOOD NUTR PHYS ACT P	59	1.4
14	Mozaffarian D, 2011, NEW ENGL J MED, V364, P2392, DOI 10.1056/NEJMoa1014296	58	1.4
15	STUNKARD AJ, 1985, J PSYCHOSOM RES, V29, P71, DOI 10.1016/0022-3999(85)90010-8	58	1.4

Table 8 study a total number of records is 4203 with total number of cited reference 155446. Out of this MATTHEWS DR, 1985, DIABETOLOGIA, V28, P412, DOI 10.1007/BF00280883 is cited with (110) times.

Table 9: Year –wise authorship pattern.

Year	Single author	Double author	Three author	Four author	Five author	Five and above	Total
2010	54	37	60	58	59	225	493
2011	68	58	53	57	49	238	523
2012	50	30	31	45	46	233	435
2013	41	28	53	48	49	211	430
2014	50	53	28	41	40	224	436
2015	42	25	28	36	40	235	406
2016	38	26	32	37	41	246	420
2017	52	61	28	24	34	238	437
2018	39	25	27	24	28	170	313
2019	44	23	14	20	26	183	310
Total	478	366	354	390	412	2203	4203

Table 9 It shows year wise authorship pattern of the research output on American journal of clinical nutrition. It indicates that out of the 478 contributions to single authors. The two authors highest contributed in the year 2017 is 61 articles; the lowest contributed in the year 2019 is 23 articles. The above 5 authors highest contributed in the year of 2016 the output measured is 246: the lowest contributed is year of 2019 the output is measured is 183.

Table 10: Degree of collaboration.

Year	Single author NS	Multiple author NM	Total No. of. (NS+NM)	Degree of collaboration
2010	54	439	493	0.88
2011	68	455	523	0.86
2012	50	385	435	0.88
2013	41	389	430	0.90
2014	50	386	436	0.88
2015	42	364	406	0.89
2016	38	382	420	0.90
2017	52	385	437	0.88
2018	39	274	313	0.87
2019	44	266	310	0.85
Total	478	3725	4203	0.88

Table 10 The above table shows the details about the degree of collaboration which indicates tend in Single and Multiple authorship during 2010 to 2019 as shows in table. The average degree of collaboration the study period is 0.88. The DC is calculated by using the formula K.Subramanium.

The formula is where,

DC = Nm/Nm+Ns

DC = Degree of Collaboration

Nm = Number of Multi Authors

Ns = Number of Single Authors

DC = Nm/Nm+Ns

DC = 3725/4203

DC = 0.88

In the present study the value of DC is **0.88**.

In the result, the degree of collaboration in the study Artificial Intelligence is 0.81 which shows the collaborations of multiple authors.

Table11: Exponential growth rate.

Year	publication	Exponential growth rate
2010	493	-
2011	523	1.06
2012	435	0.83
2013	430	0.98
2014	436	1.01
2015	406	0.93
2016	420	1.03
2017	437	1.04

2018	313	0.71
2019	310	0.99
Total	4203	8.58

Table 11 shows that the Exponential growth rate. The highest exponential growth rate is 1.06 in the year of 2011 and the lowest exponential growth rate is 0.71 in the year of 2018. The overall exponential growth rate is 8.58 out of 4203 records.

Table12: Collaboration index.

Year	Total no. of paper	Total no. of authors	Collaboration index (NA/NP)
2010	493	2948	5.97
2011	523	3101	5.92
2012	435	3059	7.03
2013	430	2796	6.50
2014	436	2686	6.16
2015	406	2953	7.27
2016	420	3180	7.57
2017	437	3122	7.14
2018	313	2200	7.02
2019	310	2918	9.41
Total	4203	28963	6.89

Table 12 Explains the collaborative index for each year of the study period from 2010-2019. Collaborative index (CI) is calculated by dividing total number of author (NA) by total number of paper contributed (NP) in the same year. In the study period, the average collaborative index is 6.89.

Table13: Author Productivity.

Year	Total no. of papers	Total no. of author	AAPP	Productivity of per author
2010	493	2948	5.97	0.16
2011	523	3101	5.92	0.16
2012	435	3059	7.03	0.14
2013	430	2796	6.50	0.15
2014	436	2686	6.16	0.16
2015	406	2953	7.27	0.13
2016	420	3180	7.57	0.13
2017	437	3122	7.14	0.13
2018	313	2200	7.02	0.14
2019	310	2918	9.41	0.10
Total	4203	28963	6.89	0.14
AAPP= Average Author Per Paper				

Table 13 For the total articles 4203, total number of author contributed were 28963, for this AAPP is 6.89 and average author productivity is 0.14.

Table 14: Relative Growth Rate (RGR) & doubling time.

Year	Total article	Total cumulative	W1	W2	R(a) (w1-w2)	Mean R(a)(1-2)	Doubling time Dt(a)	Mean Dt(a)(1-2)
2010	493	493	-	6.20	-		-	
2011	523	1016	6.20	6.92	0.72		0.96	
2012	435	1451	6.92	7.28	0.36	0.38	1.92	4.47
2013	430	1881	7.28	7.53	0.25		2.77	
2014	436	2317	7.53	7.74	0.21		3.3	
2015	406	2723	7.74	7.90	0.16		4.33	
2016	420	3143	7.90	8.05	0.15		4.62	
2017	437	3580	8.05	8.25	0.2	0.12	3.46	45.18
2018	313	3893	8.25	8.26	0.01		69.3	
2019	310	4203	8.26	8.34	0.08		8.66	
Total	4203					0.25		24.82

Table 14 shows that Relative growth rate and doubling time. The highest relative rate is 0.72 in the year of 2011. And the lowest relative growth rate is 0.01 in the year of 2018. The highest doubling time is 69.3 in the year of 2018 and the lowest doubling time is 0.96 in the year of 2011.

R (1-2) =W2-W1/T2-T1

R (1-2) = mean relative growth rate over the specified period interval

W1=log W1 (natural log of initial number of publication)

W2=log W2 (natural log of initial number of publication)

T2-T1=the unit difference between the initial time and final time

R (a)=relative growth rate per unit publication per unit of time (year)

DT (a)=0.693/R(a).

Table 15: Growth of literature.

S. No.	Years	No of Publication	X	X2	XY
1	2010	493	-4	16	-1972
2	2011	523	-3	9	-1569
3	2012	435	-2	4	-870
4	2013	430	-1	1	-430
5	2014	436	0	0	0
6	2015	406	1	1	406
7	2016	420	2	4	480
8	2017	437	3	9	1311
9	2018	313	4	16	1252
10	2019	310	5	25	1550
Total		4203			158

Table 15 shows that the growth of literature time series analysis of American journal of clinical nutrition during the period 2010 – 2019. The growth of literature time series analysis value is 158 out of 4203 publications.

Table 16: Co- author collaboration.

S. No	Author 1	Author 2	No.ofb times collaborated
1	Hu FB	Willett WC	35
2	Overvad K	Tjonneland A	31
3	Boeing H	Tumino R	24
4	Boeing H	Trichopoulou A	24
5	Trichopoulou A	Tumino R	24
6	Palli D	Tumino R	23
7	Boeing H	Tjonneland A	23
8	Hu FB	Rimm EB	23
9	Riboli E	Tumino R	23
10	Overvad K	Riboli E	22
11	Boeing H	Palli D	22
12	Riboli E	Tjonneland A	21
13	Overvad K	Tumino R	21
14	Riboli E	Trichopoulou A	21
15	Tjonneland A	Tumino R	21

Table 16 Co-author collaboration is many times collaborated in the authors in a journal, highly number of collaborated author in Hu FB and Willet WC (35)times, and Overvad K and Tjonneland A (31) times, Boeing H and Tumino R (24) times collaborated in lowest number of author collaborated in Riboli E and Tjonneland A(21) times collaborated in the journal.

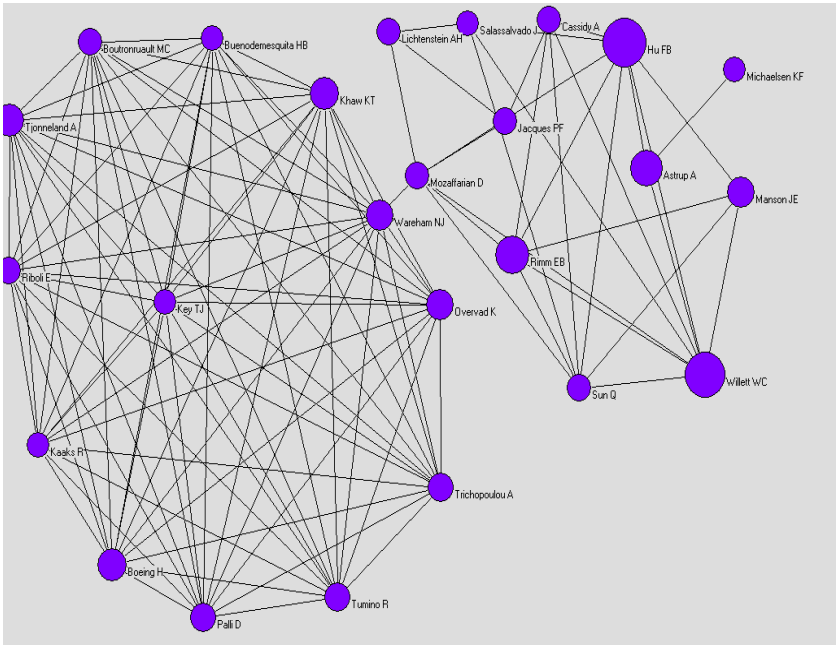

Fig. 1: Co- author collaboration.

Findings

The findings are based on 4203 articles of the Journal analysis of American journal of clinical nutrition (2010 – 2019) 10 years was taken into consideration.

- **Year wise Distribution**

The majority of the articles published in 2011 (523) articles. In the year 2010 (493) articles are published. Then followed in the year 2012 (435) articles, 2013(430) articles and 2014 (436) articles, 2015 (406) articles, 2016 (420) articles, 2017 (437) articles, 2018 (310) articles, are published. A high number of articles are published in the year 2011 and least number of articles published in year 2019.

- **Distribution of Document Type**

The research exhibits the most prominent publication is article occupies 2865 (68.2%) out of 4203 publications, followed by Letter with 520 (12.4%) contributions, Editorial material with 329 (7.8%) Retracted and Book Review 1 is published in very least number of contributions.

- **Language wise distribution**

Shows that language wise distribution of journal of "American journal of clinical nutrition" research during the period of 2010-2019. The journal distributed only in English language was total records 4203 (100.0%).

- **Most productivity of Top Fifteen Institutions**

Shows that only top fifteen institutions which are ranked the research productivity of areas. On the total number of institutions observed is 4203. It is noted that Harvard university is rank first in the most productive institutions published a maximum number is 313(7.4%). Which is followed by 211(5.0%) to got the second rank in the period of study.

- **Country wise distribution**

The United States of America is the first place for producing 2132 records. UK the second position of 712 records published. Followed by Netherlands third position of 402 records, Australia 297 records, Canada 286 records, Germany 244 records**,** Denmark 238 records, France 216 records, Sweden 185 records, Spain 181 records and other countries are published in records out of 4203.

- **The most productive authors**

The most prolific authors were ranked according to publications count. Hu FB produce a high number of articles 91 is found among the contributions. Second high number of article 75 published by Willett WC. A least number of articles 30 published by Bueno-De-Mesquita HB during the study period 2010 – 2019.

- **Zipf's law**

The words wise distribution of top fifteen keywords are using respectively. The highest time the Risk keyword is using 617(14.7%) out of 4203 records. The second time keyword intake is using 604(14.4%) out of 4203 records the study period of publications.

- **Highly cited reference**

Study a total number of records is 4203 with total number of cited reference 155446. Out of this MATTHEWS DR, 1985, DIABETOLOGIA, V28, P412, DOI 10.1007/BF00280883 is cited with (110) times.

- **Year wise authorship pattern**

It shows year wise authorship pattern of the research output on American journal of clinical nutrition. It indicates that out of the 478 contributions to single authors. The two authors highest contributed in the year 2017 is 61 articles; the lowest contributed in the year 2019 is 23 articles. The above 5 authors highest contributed in the year of 2016 the output measured is 246: the lowest contributed is year of 2019 the output is measured is 183.

- **Degree of collaboration**

The degree of collaboration which indicates tend in single author and multible author among these most highly year in the single author's and multiple author's 2011 (523) authors, 2010 (493) authors, 2014 (436) authors. A high number of author published in the year 2011 and last number of author published in the year 2019.

- **Exponential growth rate**

The highest exponential growth rate is 1.06 in the year of 2011 and the lowest exponential growth rate is 0.83 in the year of 2012. The overall exponential growth rate is 8.58 out of 4203 records.

- **Collaboration index**

Explains the collaborative index for each year of the study period from 2010-2019. Collaborative index (CI) is calculated by dividing total number of author (NA) by total number of paper contributed (NP) in the same year. In the study period, the average collaborative index is 6.89.

- **Author productivity**

For the total articles 4203, total number of author contributed were 28963, for this AAPP is 6.89 and average author productivity is 0.14.

- **Relative Growth Rate (RGR) and Doubling Time**
- The whole study period articles the mean relative growth rate of total research output is 0.38. The growth rate is 0.72 in 2011 which in increased up to date 0.08 in 2019. And the doubling time is 8.66 in 2019 which is decreased up to 0.96 in 2011. This study period doubling time mean is 4.47.
- **Growth of literature**

Shows that the growth of literature time series analysis of American journal of clinical nutrition during the period 2010 – 2019. The growth of literature time series analysis value is 158 out of 4203 publications.

- **Co-author-collaboration**

Co-author collaboration is many times collaborated in the authors in a journal, highly number of collaborated author in Hu FB and Willet WC (35)times, and Overvad K and Tjonneland A (31) times, Boeing H and Tumino R (24) times collaborated in lowest number of author collaborated in Riboli E and Tjonneland A(21) times collaborated in the journal.

CONCLUSION

Bibliometrics study is a statistical method of counting to evaluate and measure the growth of a subject. The research trend during the said time span would be clearly understood from this study and a predictive may be made for anticipatable future. An attempt was made to bring out the bibliometrics study of journal of The American journal of clinical nutrition. The present study has been exposed.

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