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ACUTE GASTROINTESTINAL BLEEDING: A BIBLIOMETRIC STUDY

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Abstract:
The study presents the trends in authorship pattern and author's collaborative research in Acute Gastrointestinal Bleeding with a sample of 1920 articles collect from Pub Med database during 2009-2018.The multi- authorship articles are higher and predominant on single authorship. The study found that the researches in this topic are keep toward team research or group research rather than solo research. Overall per capita authorship is 0.16. In this study examines different trends on authorships such as Collaborative Index, Collaborative Coefficient, Moderate Collaborative Coefficient, and Collaborative - *Authorship Index. Examine research performance national as well as Global contexts, Medicinal group as reflected in the publication output. The paper is based on Bibliometric analysis of total 1920 research articles contributed by the authors. It was seen that researchers use latest documents. The study reveals the conclusion about the three Laws of Bibliometrics i.e. Lotka's law (No. of authors) Bradford law (No. of journals)and Zipf's Law of (Word Occurrence). The findings must reveal various aspects of the characteristics and patterns of contributions of the study.*

Keywords: Bibliometrics, Acute Gastrointestinal Bleeding, Pub-Med, Authorship.

01.Introduction:

Bibliometrics Constitutes one of the major thrust of research in the field of library and information science. It utilizes quantitative analysis and statistics to describe patterns of publications within a given field or body of literature. A technique has emerged to identify the patterns of publications, authorship, citations used for a subject, etc. which is known as Bibliometrics. Bibliometric studies in recent years have attained significance because of its practical application in the evaluation of library operation and services, as a statistical and mathematical technique. It has extensive application in library and information field in identifying the research trends in particular subject, trends in authorship and collaboration research core journals, author's productivity, obsolescence and scattering of literature. It has extensive application in library and information field in identifying the research trends in particular subject, trends in authorship and collaboration research core journals, author's productivity, obsolescence and scattering of literature.

02. Definitional Analysis:2.1 Bibliometric:

Pritchard (1968) "Application of mathematical methods to books and other media of communication."

I.N. Sengupta (1985) "Organization, Classification and Quantitative evaluation of publication patterns of all macro communication along with their authorship by mathematical and statistical calculus."
'Alan Pritchard' in 1969 has coined the term bibliometrics. In general Bibliometrics is that branch of science, which studies the behaviour of information. Bibliometric studies in recent years have attained significance because of its practical application in the evaluation of library operation and services, as a statistical and mathematical technique. This study is helpful in management of scientific literature measuring the utility of periodicals and relationship between journals and subject area and also in knowing the most productive contribution in a given field.

2.2 Acute Gastrointestinal Bleeding:
Gastrointestinal bleeding (GI bleed), also known as gastrointestinal hemorrhage, is all forms of bleeding in the gastrointestinal tract, from the mouth to the rectum. When there is significant blood loss over a short time, symptoms may include vomiting red blood, vomiting black blood, bloody stool, or black stool. Small amounts of bleeding over a long time may cause iron-deficiency anemia resulting in feeling tired or heart-related chest pain.
Gastrointestinal Bleeding is categorized into two types depending upon the Anatomical location of bleeding site i.e. **Upper gastrointestinal bleeding** (UGIB) and **Lower gastrointestinal bleeding** (LGIB). **UGIB -** includes the part of gastrointestinal tract that includes the mouth, esophagus, stomach, and small. **LGIB** - It occurs distal to the ligament of Treitz involves Ileum/Jejunum, colon, Intestines, Rectum. Its causes include Hemarochoid, Inflammatory bowl diseases, Diverticulosis etc.
GI bleeding can be caused by a wide range of pathologies and they differ in onset, location, risk and clinical presentation. Accurate clinical diagnosis is crucial in determining the investigation of choice and specific treatment interventions. The correct diagnostic algorithm relies on a good understanding of the type of GI bleeding, risk evaluation and clinical presentation which may indicate the nature and source of bleeding. Upper endoscopy and colonoscopy is the mainstay of initial investigations. Angiography and radionuclide imaging are best suited for acute overt GI bleeding. Capsule endoscopy and deep enteroscopy play significant roles in the diagnosis of obscure GI bleeding, usually from the small bowel.

03. Pub Med Database

Pub Med (Published Medical Literature) is an online version of MEDLINE, available free to anyone with internet access. Pub Med is a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics. The United States National Library of Medicine at the National Institutes of Health maintains the database as part of the Entrez system of information retrieval. **Date launched:** January 1996 **Research centre:** National Library of Medicine (NLM) **Created by:** National Library of Medicine From 1971 to 1997, online access to the MEDLINE database had been primarily through institutional facilities, such as university libraries PubMed, first released In January 1996, ushered in the era of private, free, home- and office-based MEDLINE searching. The PubMed system was offered free to the public starting in June 1997. PubMed is a free resource supporting the search and retrieval of biomedical and life sciences literature with the aim of improving health–both globally and personally. The PubMed database contains more than 32 million citations and abstracts of biomedical literature.

04. Methodology

Methodology means study of method or a system of methods and rule applicant to research or work. It is connected basically with what principles and technique to be follow for collecting data information and material for a given research project. (Kothari, 1990). For the present study quantitative research method is used. It is also used as a way to research in different aspects of education.

05. Literature Review:
In recent years, many researchers have conducted Bibliometric analysis in different subject fields-
Singh,(2007)Bibliometrics involves the quantitative analysis of the literature of a subject domain, as represented by bibliographic entries such as keywords, classification codes, authors and citations, purposes

of the bibliometrics study is to find out the growth and characteristics of digital library literature. The major objectives of the bibliometrics study is to find out authorship pattern, author productivity, prolific authors, core journals in subject area, indexing terms frequency, Bradford distribution of articles, year-wise distribution of articles, language-wise distribution of articles and country-wise distribution of journals.

Yasinullah Shafiullah,Vaishali Khaparde and Fawaz Alhamdi Abdullah (2015)says that The present article deals with a bibliometric study of five volumes which contained 30 issues and a total number of 259 articles appending 7,397 citations published during the year 2010 to 2014 in the "Electronic Library Journal". The bibliographic details with regard to each article such as types of articles, number of articles in each issue, number of citations in each article, authorship patterns, publication date and the name of the journals were collected and taken into consideration for studying and analyzing. Findings showed that the highest numbers of articles (57) were published in the year 2010 and the articles published in 2014 contain the highest number of citations (1,807), around 78 percent of contributions were categorized as research studies followed by case study. The average length of articles published in The Electronic Library is 15.5 pages per article. The majority of authors cited journals (4,516 citations; 61.1%) followed by web resources (1,170 citations; 15.8%). Also the single authors (43.883 percent) have made major contribution followed by joint authors (26.895 percent), and "The Electronic Library" which is the source journal leads the table with a record number of 409 citation with 9.063 % followed Library Hi Tech (119 citations).
Jeyshankar and Vellaichamy (2015) were studied Indian research output in LungCancer. The study shows that 94% scientists preferred to publish research papers injoint authorship. They found that USA was the major collaborating partner of Indiawith a share of 24.66 % publications. Most productive Institution in India is TataMemorial Hospital, Mumbai on Lung Cancer research with 16.90 % contribution.Indian Journal of Cancer was the most productive journal of Lung Cancer researchwith contribution of 8.65 % of publications (Jeyshankar and Vellaichamy, 2015, pp.24-35).

06. Objectives of The Study: -*according to the specific field Like Year, Authorship, Journal wise distribution etc. objectives of the study categorized are as follows-*
1. To estimate the Annual growth rate **(AGR)** of publications.
2.To study the No. of journals**(Bradford law)**Wise Distribution of publication.
3. To study **Authorship distributions** of Publications:-
3.1To study the **Co – Authorship** Pattern of Publication
3.2To Estimate the **Pareto's 80/20** Principle
3.3To study Authorship Pattern Distribution -**Lotka's law** (No. of authors**)**
3.4To estimate the **Collaborative Index (CI)** of publication
3.5To estimate the **Collaborative Coefficient (CC)** of publication
3.6To estimate **Moderate Collaborative Coefficient (MCC)** of Publication
3.7To estimate **Collaborative Authorship Index (CAI)** of Publication
3.8To distributing **Authorship Per capita** Productivity.
4.To find out country-wise distribution of publication
5.To find out **ZIPF's Law** of Word Occurrence.
6. To Find out Subject Area of **Medicinal Group** of Subjects.

07. Scope and Limitation of the Study
The present study is based on Bibliometric study.The scope of the present study is limited to the 1920 articles covered on 'Acute Gastrointestinal Bleeding: A Bibliometric study' on Pub Med Database during the year (2009-2018).

08. Data Collection: The list of Articles on Acute gastrointestinal Bleeding were collected from the Pub Med Database the latest 10 Years from 2009-2018 with adequate details such as applied Bibliometrics Laws i.e. Lotka's law, Bradford law, ZIPF's law and also Estimate Collaborative Index, Collaborative coefficient etc. various other tables are made on basis upon data collected. These have been classified grouped and analyzed to find the various dimensions of the study.

09. Data Analysis: The analysis will be done as per the parameters laid down in the objectives of the study. The data collection & analysis is done for Acute Gastrointestinal Bleeding: A Bibliometric study of total 1920 articles was collected & was analyzed as per the objective laid down as well as by using various statistical tools**.**

Accordingto the objective of the study, analysis & findings of the study are outline below:

1.Annual Growth Rate (AGR) wise distribution

The growth rate is a measurement which is essential in any field. In meaning the growth of the number of publications in a particular discipline. This is often a measure of the annual increase or decrease. Here, the AGR has been determined as per the formula given below:-

AGR= (End value – First value) / (First Value) X 10

Table No. 1. - Annual Growth Rate Wise Distribution

Sr. No.	Year	Frequency	Annual Growth Rate %
1	2009	133	
2	2010	126	-5.26
3	2011	135	7.14
4	2012	156	15.55
5	2013	197	26.28
6	2014	204	3.55
7	2015	220	7.84
8	2016	244	10.9
9	2017	246	0.81
10	2018	259	5.28

In this Table 1. AGR of 2010 is -5.26 followed by 2011 are 7.14 &in the year 2012 with 15.55 are indicated.& so on Highest AGR in the year 2013 with 26.28 & Lowest AGR in The Year 2017 with 0.81.

2.Bradford law (No. of journals) -Wise Distribution of contribution

Bradford's law states that "If scientific journals are arranged in decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to subject and several zones of groups containing the same number of articles as the nucleus, then the zone will be as, 1: n: n2.

Table No 2. Bradford law(No. of journals) -Wise Distribution of contribution

	Bradford law (Number of journals)			
Zone	No. of Journal	% of Journals	No.of Article	% of Articles
First	81	7.84	640	33.33
Second	327	31.68	640	33.33
Third	624	60.46	640	33.33
Total	**1032**	**100**	**1920**	**100**

The total numbers of journal articles were grouped into 3 equal zones producing similar number of articles, i.e. 1920 articles in each zone. It can be observed from table no.2. The No. of journals& No. of Articles in 3 equal zones. The first zone 81 (No. of Article 640), Second zone 327 (No. of Article 640), Third zone 624 (No. of Article640) each published journals.

3.To study Authorship distributions of Publications:-

Table No 3.1– Co - Authorship Pattern of contribution

Year	Author Nature	Frequency	Total	Percentage	Cumulative
	Single Author	7		5.3	5.3

2009	Co-Authors	126	133	95	**100**
	Single Author	6		4.8	4.8
2010	Co-Authors	120	126	95	**100**
	Single Author	9		6.7	7
2011	Co-Authors	126	135	93	**100**
	Single Author	2		1.3	1
2012	Co-Authors	154	156	99	**100**
	Single Author	12		6.1	6
2013	Co-Authors	185	197	94	**100**
	Single Author	6		2.9	3
2014	Co-Authors	198	204	97	**100**
	Single Author	9		4.1	4
2015	Co-Authors	211	220	96	**100**
	Single Author	7		2.9	3
2016	Co-Authors	237	244	97	**100**
	Single Author	10		4.1	4
2017	Co-Authors	236	246	96	**100**
	Single Author	10		3.9	4
2018	Co-Authors	249	259	96	**100**
	Total		**1920**		

It is observed from the **Table No -3.1** that the value of Co- Authorship Pattern for Single authored papers during 2009-2018.From this table Observed that the highest Single authored papers with 12 publications (6.1%) in the year 2012 &in that same year Multi author papers are 185 publications (94%). And in the 2018 Co - Authorship Pattern for multi authored papers highest with 249 publications (96%) which indicated that the collaborative research is increasing over the study of “Bibliometrics”.

3.2Pareto’s 80/20 Rule

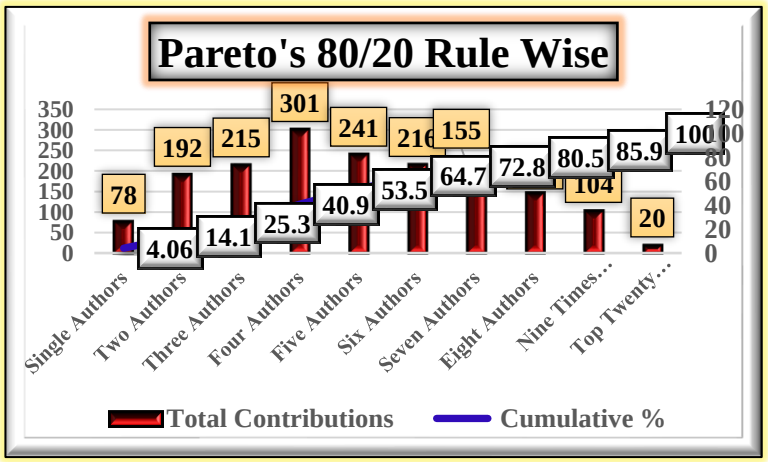
In 1906, Italian economist Vilfredo Pareto created a mathematical formula to describe the unequal distribution of wealth in his country, observing that twenty percent of the people owned eighty percent of the wealth. In the 1940s, Dr. Joseph M. Juran inaccurately attributed the 80/20 rule to Pareto, calling it Pareto’s Principle.More generally, the pareto Principles is the observation (Not Law) that most things in life are not distribution evenly. It can mean all of the following things: 20% of the input creates 80% of the result

20% of the workers produce 80% of the result

20% of the customers create 80% of the revenue, 20% of the bugs because 80% of the crashes, 20% of the features cause 80% of the usage and so on.

We must remember that idea: The numbers 20 and 80 must add to 100 – they don’t! 20% of the workers could create 10% of the result, or 50%. Or 80% or 99%, or even 100%. Think about it- in a group of 100 workers, 20 could do all the work while the other 80 goofs off. In that case, 20% of the workers did 100% of the work. Remember that the 80/20 rule is a rough guide about typical distributions.

Figure no – 01 Pareto 80/20 Rule Distribution



This implies that the numbers of items are much more than the number of sources. In bibliometric/Informetric context, 20% of holdings account for 80% of circulation of library books, 20% of authors account for 80% of publication, etc. It is observed form the above
Figure No –01that, the of single authors have written 4.6 % total publication, two authors written 14.1, followed by three authors 25.3, four authors 40.9 & Top Twenty is 99.0 that it should be in increasing order.

3.3Lotka's law (No. of authors)

Generally Lotka's Law describes the frequency of publications by authors in a given subject/discipline.

X (no. of authors)	*Y (no. of Publication)*	*Log of X*	*Log of Y*	*XY*	*X2*
1	78	0.00	1.89	0.00	0.00
2	192	0.30	2.28	0.69	0.09
3	215	0.48	2.33	1.11	0.23
4	301	0.60	2.48	1.49	0.36
5	241	0.70	2.38	1.66	0.49
6	216	0.78	2.33	1.82	0.61
7	155	0.85	2.19	1.85	0.71
8	147	0.90	2.17	1.96	0.82
9	104	0.95	2.02	1.92	0.91

Table 3.3identifies the distribution of articles according to the number of contributors. The highest number of four authors is accounts for 301(15.68%) and the number of Ten authors is the lowest and it accounts for 64 (3.33%) and Single authors accounts 78(4.06%). Where, Collaborative Research is Predominant than Solo Research.

3.4To findCollaborative Index of Contribution

Table No – 3.4: Collaborative index

Year	Single	Two	Three	Four	Five & Above	Total Article	CI
2009	7	12	22	17	75	133	4.06
2010	6	16	9	12	83	126	4.19
2011	9	13	11	11	85	135	3.97
2012	2	26	21	30	79	156	4.05
2013	12	19	20	40	106	197	4.06
2014	6	21	25	42	112	204	4.17
2015	9	27	29	38	117	220	4.03
2016	7	22	30	40	147	244	4.24
2017	10	16	23	34	164	246	4.33
2018	10	20	25	37	166	259	4.25
Total	**78(4.06)**	**192(10%)**	**215(11.19)**	**301(15.67)**	**1134(59.06)**	**1920**	**4.15**

This is one of the early measures of degree of collaboration derived by Lawani (1980).

$$CI = \frac{\sum Aj=1jfi}{N}$$

It is a measure of mean number of authors. Although it is easily computable, it is not easily interpretable as a degree, for it has no upper limit. Moreover; it gives a non-zero weight to single-authored papers, which involve no collaboration.

CI = [(f1) 1 + (f2) 2 + (f3) 3 + … (fk) k] / N

Using data in the Table 3.4, during 2009-2018,

CI = (7 + 12 X 2 + 22X 3 + 17X 4+75X5) / 133

= 7+ 24+ 66 + 68+375 = 540
= 540 / 133= 4.06
Table 3.4 shows the variation in the CI. It varies from 4.06 in 2009lowest CI in the year 2011 i.e. 3.97 and highest Collaboration we can notices in 2017 i.e. 4.33 this may be due to the geographical or environmental factors of the organization. Final total Collaborative Index is 4.15.

3.5 To study Collaborative Coefficient:
According to Ajiferukeet al. (1988) who have shown the mean number of authors per paper, the proportion of multiple authorship as a measure of degree of collaboration in a discipline, is inadequate. Therefore, they have proposed a measure combining some of the merits of both measures into what is known as Collaborative Coefficient.
Suppose, if a paper has a single author, the author receives one credit; if two, each receives ½ credits. In general, if we have 'n' authors each receive 1/n credits. Hence, the average credit awarded to each author of a random paper is E [1/n], a value which lies between 0 and 1. If '0' is to correspond to single authorship, then the CC is defined as:
CC = 1-E [1/n]
= 1- (1/j) p (N=j) **and its sum ∑ rate = 1-f1+ (1/2) f2+ (1/2) f3+… (1/k)fk**
N
Where: Fjis the number of j-authors research papers published in a discipline during a certain period of time, Nis the total number of research papers published in a discipline during a certain period of time (excluding anonymous authors) and K is the greatest number of authors per paper in a discipline. Ajiferuke et al were of the opinion that the CCincorporates the sum of the merits of both CI and DC. It lies between 0 and 1 (0<=cc>1). It tends to zero as single authored papers dominate and differentiates among levels of multiple authorship.

Table no 3.5 –Collaborative Coefficient

Year	Single	Two	Three	Four	Five & Above	Total Article	CC
2009	7	12	22	17	75	133	0.70
2010	6	16	9	12	83	126	0.71
2011	9	13	11	11	85	135	0.71
2012	2	26	21	30	79	156	0.71
2013	12	19	20	40	106	197	0.69
2014	6	21	25	42	112	204	0.72
2015	9	27	29	38	117	220	0.70
2016	7	22	30	40	147	244	0.72
2017	10	16	23	34	164	246	0.72
2018	10	20	25	37	166	259	0.72
Total	78 (4.06%)	192 (10%)	215 (11.19%)	301 (15.67%)	1134 (59.06%)	1920	0.71

Table 3.5 shows the CC has increased from 0.70 in 2009 to 0.72 in 2018 indicating that research among scientists is fairly collaborative with an average CC is 0.71.
CC = 1 – [f1 + (1/2) f2 + (1/3) f3 +… + (1/k) fk] / N
Based on the data in the 3.5, using the values for f1, f2, and f3, CC for the year 2001
CC = 1 – {[6 + (1/2) 16+ (1/3) 9 + (1/4) 12+ (1/5)83] / 126 N}
= 1 – {[6+ 8 + 3+ 3+16.6] / 126}
= 1 – [36.6 / 126]
= 1 – 0.290
CC = 0.71

3.6Moderate Collaborative Coefficient
The derviation of the new measure is almost the same as that of CC, as given in Ajiferuke et al. Imagine that each paper carries with it a single "credit", this credit being shared among the authors. Thus if a paper has a single author, the author receives one credit; with 2 authors, each receives 1/2 credits and, in general, if we

have X authors, each receives 1/X credits (this is the same as the idea of fractional productivity defined by Price and Beaver as the score of an author when he is assinged 1/n of a unit for one item for which n authors have been credited.)

Hence the average credit awarded to each author of a random paper is E[1/X], a value that lies between 0 and 1. Since we wish 0 to correspond to single authorship, we define the Modified Collaborative Coefficient (MCC),

κ, as:κ = α{1−E[1/X]}

= α {1− ∑ (1/j) P (X = j)}

= α {1− ∑jA=1 (1/j) fj}

N

Where α is a normalization constant to be determined. Setting α = 1 yields the measure CC. The requirement that κ = 0 for single authorship does not restrict α.

If all N articles involve all the A authors, then E[1/X] = 1/A. If we want κ to satisfy the requirement that κ = 1 for maximal collaboration, then we must set

$\alpha = 1 - \frac{1}{A}^{-1} = \frac{A}{A-1}$

We thus obtain from Eqs (4) and (5) the final expression for MCC, which is:

$\kappa = (1- 1 - \frac{1^{-1}}{A}\{1-E[1/X]\}$

= A{1−P(1/j)P(X = j)}

A – 1

$\kappa = A\frac{A}{A-1}$ {1 - ∑ jA =1 (1/j) fj

N

The above equation is not defined for the trivial case when A = 1, which is not a problem since collaboration is meaningless unless at least two authors are available. CC approaches MCC only when A −→ ∞, but is otherwise strictly less than MCC by the factor$\frac{A}{A-1}$

Table No - 3.6Moderate Collaborative Coefficient

Year	Single	Two	Three	Four	Five & Above	Total Article	MCC
2009	7	12	22	17	75	133	0.70
2010	6	16	9	12	83	126	0.71
2011	9	13	11	11	85	135	0.71
2012	2	26	21	30	79	156	0.71
2013	12	19	20	40	106	197	0.70
2014	6	21	25	42	112	204	0.72
2015	9	27	29	38	117	220	0.70
2016	7	22	30	40	147	244	0.72
2017	10	16	23	34	164	246	0.73
2018	10	20	25	37	166	259	0.72
Total	**78(4.06)**	**192(10%)**	**215(11.19)**	**301(15.67)**	**1134(59.06)**	**1920**	**0.71**

MCC for distribution of authorships for 2009 in Table no. 3.6 is calculated thus:

κ = A / A−1 (1−PA j=1(1/j) fj N) =133

MCC = (133/133-1) [1- (=1*7+(1/2)*12+(1/3)*22+(1/4)*17+(1/5)*75/(N)/133]

= (1.007)[1-(7+6+7.33+4.25+15)/133]

= 1.007[1-(39.58/133)]

= 1.007 (1-0.297)

= 1.007 X 0.703

= 0.70

Similarly, values of MCC for 2010 to 2018 are calculated and displayed along with the corresponding values of MCC in Table No. 3.6.

3.7 Collaborative - Authorship Index

The Co - Authorship Index (CAI) can be measured by calculating proportional output of single, two, multi, and Mega-authored papers for different nations. The following mathematical formula of Garg and Padhi has been used to determine the Co-authorship pattern.

CAI = {(Nij / Nio) / (Noj / Noo)} × 100

Nij: number of papers having j authors in block i

Nio: Total output of block i

Noj: number of papers having j authors for all blocks

Noo: total number of papers for all authors and all blocks j = 1, 2, 3, 4, ≥5. CAI = 100 implies that co-authorship in a particular block for a particular type of authorship corresponds to the world average, CAI > 100 reflects higher than average co-authorship effort and CAI < 100 indicates lower than average co-authorship effort in a particular block for a particular type of authorship.

Table 3.7Collaborative - Authorship Index

Year	Single	CAI	Two	CAI	Three	CAI	Four	CAI	Five & Above	CAI	Total Article
2009	7	1.29	12	0.90	22	1.47	17	0.81	75	0.95	133
2010	6	1.17	16	1.26	9	0.63	12	0.6	83	1.11	126
2011	9	1.62	13	0.96	11	0.72	11	0.51	85	1.06	135
2012	2	0.30	26	1.66	21	1.2	30	1.22	79	0.85	156
2013	12	1.48	19	0.96	20	0.9	40	1.29	106	0.91	197
2014	6	0.71	21	1.02	25	1.04	42	1.31	112	0.92	204
2015	9	0.98	27	1.22	29	1.17	38	1.1	117	0.9	220
2016	7	0.69	22	0.9	30	1.09	40	1.04	147	1.02	244
2017	10	1	16	0.65	23	0.83	34	0.88	164	1.12	246
2018	10	0.98	20	0.77	25	0.86	37	0.91	166	1.08	259
Total	**78(4.06)**	**100**	**192(10%)**	**100**	**215(11.19)**	**100**	**301(15.67)**	**100**	**1134(59.06)**	**100**	**1920**

Table 3.7 illustrates the Co-Authorship Index. It is observed that a decreasing trend has been seen in the value of CAI for Single (i.e. 1.29 to 0.98) two, three authored papers respectively. Conversely, an increasing trend has been seen in four (i.e.0.81 to 0.91) and five & above authored articles during the study period. This indicates that four and five & above - authored papers are increasing year by year in Indian LIS publications.

3.8Authorship Per-capita Analysis

The analysis revealed that 11655 authors contributed 1920 items during the period between 2009 and 2018. From this data, the per capita authorship could be calculated as

Per Capita Authorship = number of items / Number of authors

= 11655/1920 = 0.16 the per capita authorship is 0.16

Table 3.8 Authorship Per capita Productivity – Year wise analysis

Year	Authors	Publication	Per Capita
2009	674	133	0.20
2010	751	126	0.17
2011	787	135	0.17
2012	794	156	0.20
2013	1095	197	0.18
2014	1172	204	0.17
2015	1279	220	0.17
2016	1600	244	0.15
2017	1738	246	0.14
2018	1765	259	0.15
Total	**11655**	**1920**	**0.16**

From the collected data is observed that there is large variation in the per capita authorship in each year that is shown in Table 3.8the per capita authorship ranges from 0.14 to 0.20 while the overall per capita authorship is 0.16. This indicates that the survival rate of most of the authors is more.

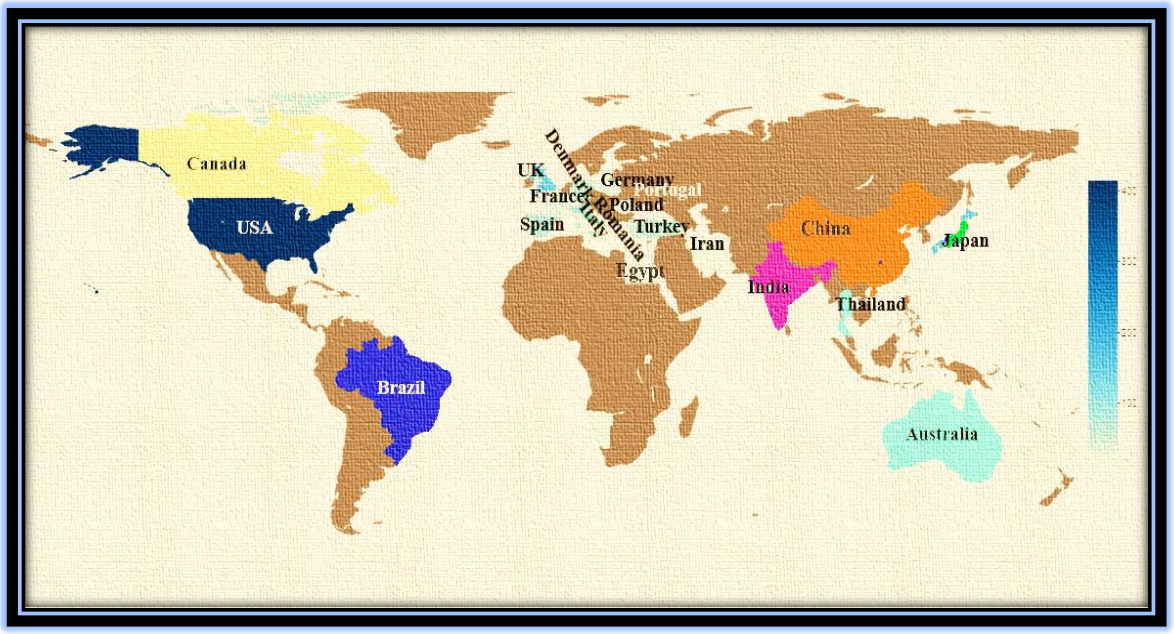
4. Table No. – 4Country Wise Distribution of publication

Sr. No.	Geographical Regions	Frequency	Percentage%
1	USA	415	21.61
2	China	164	8.54
3	Japan	144	7.50
4	UK	140	7.29
5	Korea	107	5.57
6	Italy	78	4.06
7	Taiwan	70	3.65
8	Spain	64	3.33
9	India	61	3.18
10	Turkey	58	3.02
11	Germany	54	2.81
12	Canada	50	2.60
13	France	35	1.82
14	Australia	29	1.51
15	Brazil	27	1.41
16	Greece	25	1.30
17	Iran	25	1.30
18	Netherland	21	1.09
19	Poland	21	1.09
20	Romania	18	0.94
21	Israel	16	0.83
22	Portugal	16	0.83
23	Singapore	15	0.78
24	Denmark	15	0.78
25	Switzerland	13	0.68
26	Egypt	13	0.68
27	Thailand	11	0.57
28	Ten & Less than ten times Countries	177	9.22
29	One times Country	14	0.73
30	NA	24	1.25
	Total	**1920**	**100.00**

Certain countries give more research output in a particular subject than others. This is very much useful not only for the information manager in finalizing the subscription list of periodicals but also for the research scholars as they tend to know the countries that are leaders in their respective field of research.
The study regarding the country wise distributions has been done in order to know the most dominant countries in which the information is available.

Table No 4 reveals that USA with 415 (21.61%), china 164 (8.54%) followed by Japan 144 (7.07%), then UK 140 (7.29%) as per as follows in table & Geographical Maps. However in 24 (1.25%) countries place of publication is not mentioned.

Figure No.02 Geographical Distribution :-



'The figure despites only 20 Countries'

5.Zipf's Law of Word Occurrence

This law states that, "in a long textual matter if words are arranged in their decreasing order of frequency, then the rank of any given word of the text will be inversely proportional to the frequency of occurrence of the world" i.e. ral/f {where V' is rank and '/' is frequency) rf = c (where, c is constant) Taking log on both the sides, Log (f) + log (r) = log c Or log (f) + log (r) = c {where, c is constant) To apply this law, the words (terms) were collected from the title of the articles and ranked according to their frequency of occurrence in decreasing order. Only those words occupying frequency up to 50 items are given in Table 4.24. On applying this law, it was found that log of frequency of occurrence of words when added to log of their rank; the results are almost same for each word.

Table 5.ZIPF's LAW OF WORD OCCURRENCE

Sr. No.	Keywords	Frequency	Rank	Log c
1	Gastrointestinal bleeding	159	1	2.201
2	Endoscopy	127	2	2.404
3	Gastrointestinal hemorrhage	120	3	2.556
4	Upper gastrointestinal bleeding	88	4	2.546
5	Hemorrhage	64	5	2.505
6	Bleeding	59	6	2.549
7	Portal hypertension	53	7	2.569
8	Variceal bleeding	53	8	2.627
9	Cirrhosis	50	9	2.653

The log of frequency of three most potent words appeared in the titles "Acute Gastrointestinal Bleeding" is given below:

Word 1 - Gastrointestinal bleeding

Frequency – 159, Rank- 1

Log of frequency + log of rank =Log 159 + log 1 = 2.201 + 0 = 2.201=2.201 word

Word 2 – Endoscopy

Frequency: 127, Rank: 2

Log of frequency + log of rank = Log 127 + log 2 = 2.103+ 0.301= 2.404 word

Word 3 - Gastrointestinal haemorrhage
Frequency: 120, Rank: 3
Log of frequency + log of rank =Log 120 + log 3 = 2.073 + 0.477= 2.556 word
Thus, it is proved that Zipf s law is valid even today.

6. Medicinal Subject Category Wise Distribution
According to the Bradford's Law of Scattering as explained earlier, most of the information on a given subject appears in certain core journals. However, a significant amount of literature is published in journals of other related or marginal subjects. This analysis has been done on the basis of subject field of Journals publishing in the literature.

Table No.6 Medicinal Subject Wise Distribution

Sr.No.	Subject Area	No.of Articles	Percentage %	Cumulative Frequency	Rank
1	Medical Science - Gastroenterology	448	23.33	23.33	1
2	Medical Science – Surgery	272	14.17	37.5	2
3	Medical Science – Medicine (Scientific)	263	13.7	51.19	3
4	Medical Science - Internal / General Medicine (Clinical)	106	5.52	56.72	4
5	Medical Science - Radiology	90	4.69	61.4	5
6	Medical Science – Hepatoloy	82	4.27	65.67	6
7	Medical Science – Cardiology	75	3.91	69.58	7
8	Medical Science - Digestive Diseases	54	2.81	72.39	8
9	Medical Science – Pediatrics	50	2.6	75	9
10	Medical Science - Pharmacology	45	2.34	77.34	10
11	Medical Science – Oncology	37	1.93	79.27	11
12	Medical Science – Epidermiology	28	1.46	80.73	12
13	Medical Science – Endocrinology	25	1.3	82.03	13
14	Medical Science – Transplantation	25	1.3	83.33	13
15	Medical Science – Neurology	24	1.25	84.58	14
16	Medical Science – Therapeutic	24	1.25	85.83	14
17	Medical Science – Coloproctology	23	1.2	87.03	15
18	Medical Science – Haematology	22	1.15	88.17	16
19	Medical Science – Health	20	1.04	89.22	17
20	Medical Science – Biomedicine	19	0.99	90.21	18
21	Medical Science – Nephrology	17	0.89	91.09	19
22	Medical Science - Drug Therapy	16	0.83	91.92	20
23	Medical Science – Respiratory	14	0.73	92.65	21
24	12 times subject area 12*3=36	36	1.88	94.53	22
25	Medical Science – Microbiology	11	0.57	95.1	23
26	Ten times subject area 10*2=20	20	1.04	96.14	24
27	Nine times of Subject Area 9*2=18	18	0.94	97.08	25
28	Medical Science - Diagnostic Imaging	8	0.42	97.50	26
29	Medical Science - Nuclear Medicine	6	0.31	97.81	27
30	Five times of Subject Area 5*3=15	15	0.78	98.59	28
31	Four times of Subject Area 4*2=8	8	0.42	99.01	29
32	Three times of Subject Area 3*3=9	9	0.47	99.48	30
33	Two times of Subject Area 2*4=8	8	0.42	99.89	31
34	One times of Subject Area 1*2	2	0.10	100.00	32
	Total	**1920**	**100**		

Table no 6 shows that the total number of 1920 items appearing in Journals are belonging to 47 different subjects. The table gives a subject wise break up in the field of "Acute Gastrointestinal Bleeding". It is revealed that 'Medical Science-Gastroenterology' possesses the highest no. of articles (448 constituting 23.33%) and occupies the first in the list. Thesecond, third, fourth and fifth position is occupied by 'Medical Science-Surgery', 'Medical Sciences-Medicine', 'Medical Science -Internal Medicine' and 'Medical Sciences-Radiology' with items 272 (14.17%), 263 (13.70%), 106 (5.52%) and 90 (4.69%) respectively.

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