

Assessment of Bradford Law's of Scattering to Psoriasis Literature through Bibliometric Snapshot

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ABSTRACT

The purpose of this paper is to analyse the application of Bradford's Law of Scattering to the Psoriasis literature published during 1960-2009. Psoriasis is a kind of skin disease prevalent all over the world. The therapy of mild-to-moderate Psoriasis has come a long way from the days of tar and anthralin, though the latter treatments are still occasionally used. The paper presents an overview on scholarly contribution presented on Bradford law applied in different studies both theoretical as well as practical aspects of the law and it is being tested here over Psoriasis literature. The data for this study has been taken from PubMed for the period of 50 years (1960-2009) and it yielded 24031 citations. A ranked list of journals has been prepared and it is found that *British Journal of Dermatology* is most productive journal which has published 8.54 % article on psoriasis. As far as the implication of Bradford law is concern, in theoretical aspect this law does not fit, but the alternatives such as Leimkuhler model holds good for Psoriasis literature.

Keywords: Psoriasis, Bradford law, scattering of journals, citation analysis

1. INTRODUCTION

There have been various bibliometric or related studies of literature published for various diseases. These meta-reviews of literature through bibliometric analysis reflect the intellectual capital of the field both in research productivity and research impact. The basis of the literature analysis is lies in the source of information for it. For Bibliometric studies, the most reliable source is 'Science Citation Index' published by Institute of Scientific Information, Philedelphia. The other sources are Scopus database, covers engineering disciplines extensively and PubMed database dedicated to medicine and scientific literature. Nowadays, the Google scholar is also being utilised as a source of information for citation data, but not as extensive as information available in Science Citation Index or Scopus. The reliabilities of the bibliometric analysis lies on which sources are selected, which selection criteria is applied and how these criteria are founded in an understanding of the scholarly communication process¹.

The publication behaviour of potential authors and the importance of source in which they wish to publish has been a major research topic in the field of information science. This issue has been felt when SC Bradford analysed the publication of engineering disciples in 1953. He generalised the phenomenon which illustrates that 'article of interest to a specialist must not only occur in the periodical of specialised subject, but also from other periodical

from time to time, which grow in number as the relation of their field to that subject lessens and the number of articles on his subject in each periodical diminishes'². These observations later were known as 'Bradford Law of Scattering' which describes how documents in a subject are statistically distributed among the publishing source.

In every field of research, there are some popular journals which are frequently referred and authors wish to publish in those journals because of close relationship with the field of research field and journal. These are referred as core journals. In case of medical science, engineering and technology fields the large number of journals is available for publication of research outcomes. The assignments of core journals in these areas are essential task for information science, to help the scientists to choose right journal for publishing pertinent research. Arguing to the statement came from Bradford, in 1979, Garfield given a different version of the statement which illustrates that the there is overlapping of the journal while publication and this was better known as Garfield's Law of Concentration. According to this, the tail of the literature of one disciple consists of the cores of the literature of other disciplines. So large is the overlap between disciplines, that the core literature for all the scientific disciplines involves a group of no more than 1000 journals and may involve as few as 500^{3,4}. Garfield illustrated that in each field,

practitioners can easily identify the most important journals publishing highest quality of materials. To solve this empirical formulation, the measure has been adopted; one of such measure is the impact factor (IF) of the journals and considers them scholarly journals. Different studies have quantified the scholarly journal in their study to mark journals as scholarly⁵⁻⁷. This preliminary investigation has laid the foundation of the study to test the implication of Bradford law in the area of Psoriasis research.

Psoriasis is an inflammatory skin condition. The obvious sign is the colour change associated with the plaques (the raised patches on the skin). Psoriasis is a chronic, recurrent inflammatory skin disease that affects 2–3 % of the population in the UK. Fair-skinned people, wherever they live, are equally affected by Psoriasis, but it is much less common in African, Caribbeans, and Asians; and virtually non-existent in Inuit people and Native Americans. Various studies show the prevalence of the Psoriasis in different regional and ethnic group and their effect on human population⁸⁻¹³.

Psoriasis on its own can be a serious disease and more than enough for someone to cope with, but when it is complicated by other diseases such as arthritis¹⁴, heart attack¹⁵, diabetes¹⁶, it has adverse effect on health. About 10 % of people with psoriasis are thought to have arthritis as well, but the real number may be higher as not everyone reports it or link it to the psoriasis. In today's National Health Service, there is great emphasis on informing and empowering patients, and this applies as much to people with long-term (chronic) skin problems such as psoriasis as to those with other diseases¹⁷. Thus such kind of literature which has enunciated a much debate on the different issue related to this disease and attracted the attention of medical scientists towards it for diagnostic and in search of better treatment solution to cure this disease. At the same time, the scientists are also looking ahead to the pertinent literature on such topics as well as publishing their results in prominent places in order to fetch the attention of the masses to those literatures. Bibliometric study in this regard helping the research community in analysing the trends of publication in different scientific and technical field and helping the scientists to choose right kind of the source. This study is also taken with same motives to investigate the patterns of publication in the area of psoriasis research and investigate the patterns of publication through Bradford law of scattering.

2. OBJECTIVES

The major objective of this study is to analyse the dispersion pattern of journals publishing Psoriasis literature. Based on this dispersion study, to prepare

a ranked list of journals and test the Bradford's law of scattering.

3. METHODOLOGY

The data for this study was collected from PubMed database of NCBI, USA. A ranked list of journals prepared based on the most productive journals publishing Psoriasis literature. A total of 24031 references have been retrieved from the database and taken into consideration for the study. It is found that the 2143 journals have produced 24031 documents during the period of 1960-2009. These 2143 journals have been analysed to test the Bradford laws to see the patterns of publications in these journals.

To test the Bradford observation over the literature in the field of Psoriasis, the whole literature has been divided into three zones or groups. The conclusion derived by the Bradford states that the ratio of the titles of journal in successive zones followed a common pattern and it states as if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and there are several groups or zones containing same number of periodicals in the nucleus and succeeding zones will be in 1: n : n^2 , where n is a multiplier¹⁸ and the observation of Bradford later described as linear relation by Brookes¹⁹ which is expressed as:

$$F(x) = a + b \log x$$

where, $F(x)$ is the cumulative number of references contained in the first x most productive journals, and a and b are constant. Brookes linear expression of Bradford law is most widely used formulation.

Again, Vikery²⁰ extended the verbal formulation of the Bradford law to show that its application in any number of zones of equal values. Later on Leimkuhler²¹ has given a simple expression of Bradford law which is later known by his name and its is expressed as:

$$R(r) = a \log(1+br)$$

where, $R(r)$ is the cumulative number of articles contributed by journals ranked 1 through r , and a and b are parameters. Similarly, Brooks derivation of journals productivity takes the form

$$R(r) = a \log(b/r)$$

Further, Wilkinson²² noticed that the formulae provided by Leimkuhler and Brookes did not describe the same phenomenon. Several other mathematicians provided different models but the Brookes and Bradford laws, however, gained more acceptance than others.

4. THEORETICAL INTERPRETATION OF BRADFORD LAW

The quantitative relationship between journals and paper publish by the journal is the key observation

which can be drawn from the Bradford law, where small number of core journals occupy the nucleus of papers in a given subject. This occupancy is related in a linear expression where a substantial percentage (about one third) of the articles accounts for it, followed by a second larger group of journals accounts for another one third and where as much larger group of journals have last third. This law is popularly known as Bradford Law of Scattering. The theoretical interpretation of the Bradford law was tested from time to time for various subject literatures and the given hypothesis was proved or disproved, and also alternatives, analogy and models have been suggested from time to time. Some of such studies where this law is applied to test its applicability is on study of doctoral thesis citation at Indian Institute of Science²³, growth of literature and ranking of biochemistry journals²⁴, theoretical population genetics²⁵, etc. Some of the research using literature scattering and Bradford law model related to the testing its validity with other models includes application of Bradford law to the calculation of Leimkuhler's law and some literature focuses on the problems associated with the application of Bradford Law²⁶.

Based on these literatures it is concluded that the Bradford did not give mathematical model, but the model came from Brooks, Vickery and Leimkuhler. Sudhier²⁷ experimented the model proposed by Leimkuhler and Bradford law for assessing their utilities in dispersion of literature in a study of doctoral thesis citation at Indian Institute of Science and it is given as under. In this study he explains the Leimkuhler model expressed in the form of verbal formulation of Bradford law as:

$$R(r) = a \log(1+br), \quad r = 1, 2, 3 \quad (1)$$

Egghe²⁸ explained Leimkuhler model as

$$a = Y_0 / \log k \quad (2)$$

$$b = k-1/r_0 \quad (3)$$

where, r_0 is the number of sources in the first Bradford zone, Y_0 is the number of items in each Bradford zone and k is Bradford multiplier. $R(r)$ is cumulative number of items produced by the sources of ranks 1,2,3... r and a and b are the constant appearing in Leimkuhler model.

For calculation of the Bradford Multiplier, Egghe has given a mathematical expression as:

$$k = (e^x y_m)^{1/p} \quad (4)$$

The value of $e^x = 1.781$. His expression is based on, if the sources are ranked in decreasing order of productivity, then expression y_m is the number of items in the most productive source. Then,

$$Y_0 \text{ and } r_0 \text{ are expressed as}$$

$$Y_0 = y_m^2 \log k \quad (5)$$

$$r_0 = (k-1)y_m \quad (6)$$

Once one gets the value of p in Eqn. (4), the value of k can be calculated by using the following Eqn.

$$k = (1.781 y_m)^{1/p} \text{ and} \quad (7)$$

$Y_0 = A/p$, where A is the total number of articles.

Again, let T represents the total number of journals in Bradford zone, then there are $r_0 k^{i-1}$ sources would constitute the group ($i = 1, 2, 3, \dots, p$)

$$T = r_0 + r_0 k^2 + \dots + r_0 k^{p-2} \quad (8)$$

$$\text{So, } r_0 = T / (1+k+k^2+\dots+k^{p-1}) = T(k-1)/(k^p-1) \quad (9)$$

From this, one is able to derive the value of A and T , r_0 and y_0 can be calculated by expression using Eqn. (7) which gives the value of p . This whole expression is tried here to justify the application of Bradford law and Leimkuhler model to test their fitness of good for the literature in Psoriasis.

5. RESULTS AND DISCUSSIONS

5.1 Growth of Literature

During 1960 and 2009, 24031 articles indexed in PubMed database on Psoriasis and it is found that there is a global increase in the number of research output. Table 1 presents the country wise distribution of publication on Psoriasis. 43.69 % of papers were brought out by the authors whose address was in USA. There were 22.7 % papers published by authors of UK, 10.4 % were published by authors in Sweden, 5.20 % of publication by authors of Switzerland, 5.05 % publications by authors of Australia, 2.26 % of publication by authors of Germany and 1.4 % by authors of Malaysia. There were 9.31 % of papers published by 64 more countries of the world. It is found that the most of the papers came from the geographical locations where white skin population is more prevalence. There are various epidemiological studies justifies it and reported that the prevalence of Psoriasis disease is more common or increasing year by year. These geographical locations are USA¹⁰, Australia¹¹, Sweden¹² and Norway¹³ to justify the prevalence of Psoriasis. This laid the solid confirmation of increased research in psoriasis in the countries depicted in Fig. 1 as an outcome of this study.

Psoriasis publications during the study period appeared in 30 different languages and the most common medium of communication was English (74.92 %), German (8.26 %), Russian (4.82 %) and 3.95 % papers appeared in French language.

5.2 Highly Productive Journals

The 24031 articles were published by 2143 journals. 949 journals (44.28 %) published one article each, and the *British Journal of Dermatology* (ISSN 1365-2133; IF (2011): 3.666) has published 1777 articles (8.54 %). The second rank hold by *Journal of Investigative Dermatology* with 1247

Table 1. Most productive countries on Psoriasis literature

Country	Time Period					Total (%)
	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009	
United States	1,041	1,711	2,271	2,142	3,336	10,501 (43.69 %)
United Kingdom	542	927	1,141	1,154	1,692	5,456 (22.70 %)
Sweden	263	428	543	537	729	2,500 (10.40 %)
Switzerland	120	201	258	262	409	1,250 (5.20 %)
Australia	127	183	263	258	372	1,203 (5.05 %)
Germany	51	97	84	129	184	545 (2.26 %)
Malaysia	34	64	79	73	88	338 (1.40 %)
Rest 64 countries	175	249	249	408	1,159	2,238 (9.31 %)
Total	2,353	3,860	4,888	4,963	7,969	24,031

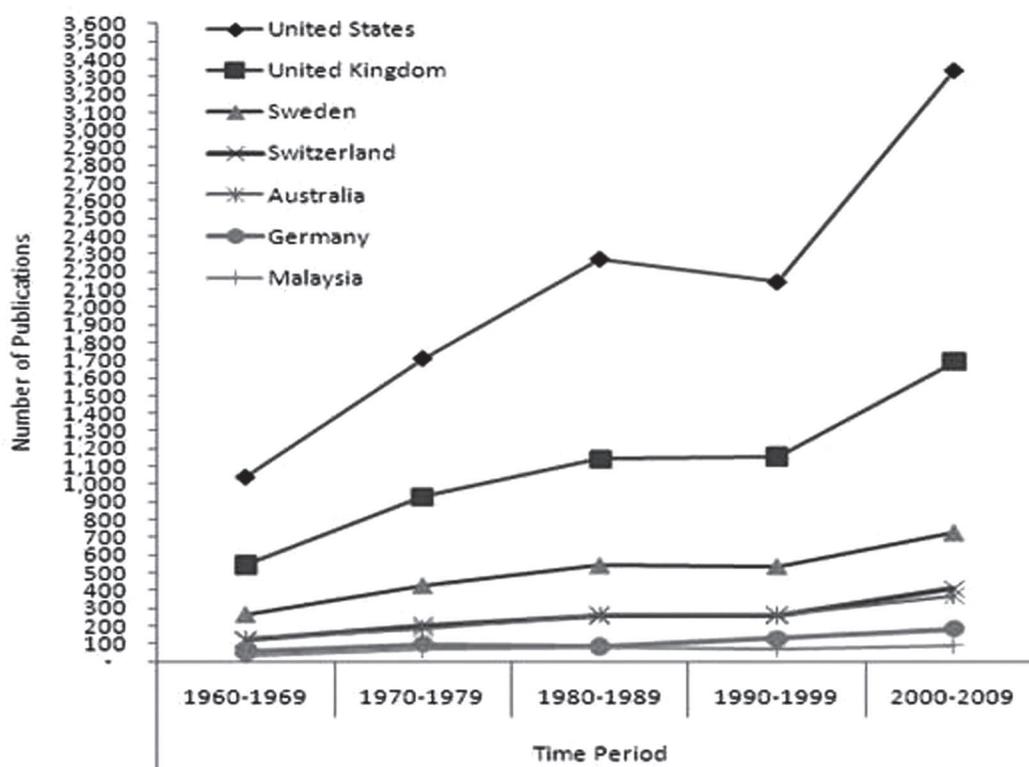


Figure 1. Trends of Psoriasis growth in most productive countries.

articles (5.19 %), the third rank was held by *Journal of the American Academy of Dermatology* with 1217 articles (5.06 %), and the fourth rank was held by *Archives of Dermatology* with 1066 articles (4.44 %) (Table 2).

There are 35 journals which have published papers ranging 50-100, 56 journals publishes papers ranging 25-49, 17 journals published papers ranging 10-24, 33 journals published 9 articles each, 29 journals published 8 articles each, 32 journals published 7 articles each, 55 journals published 6 articles each, 75 journals published 5 articles each, 130 journals

published 4 articles each, 197 journals published 3 articles each, 347 journals published 2 articles each, while 949 journals published one article.

The core journals in any field of study are chosen based on the subject coverage, and play a crucial role in selection of journals for publication or research articles. The selection criterion of ranking of the core journals usually made based on the number of citation received by the articles published in that journal during a period.

So, the ranking of the journals publishing Psoriasis literature is made on the basis of number of papers

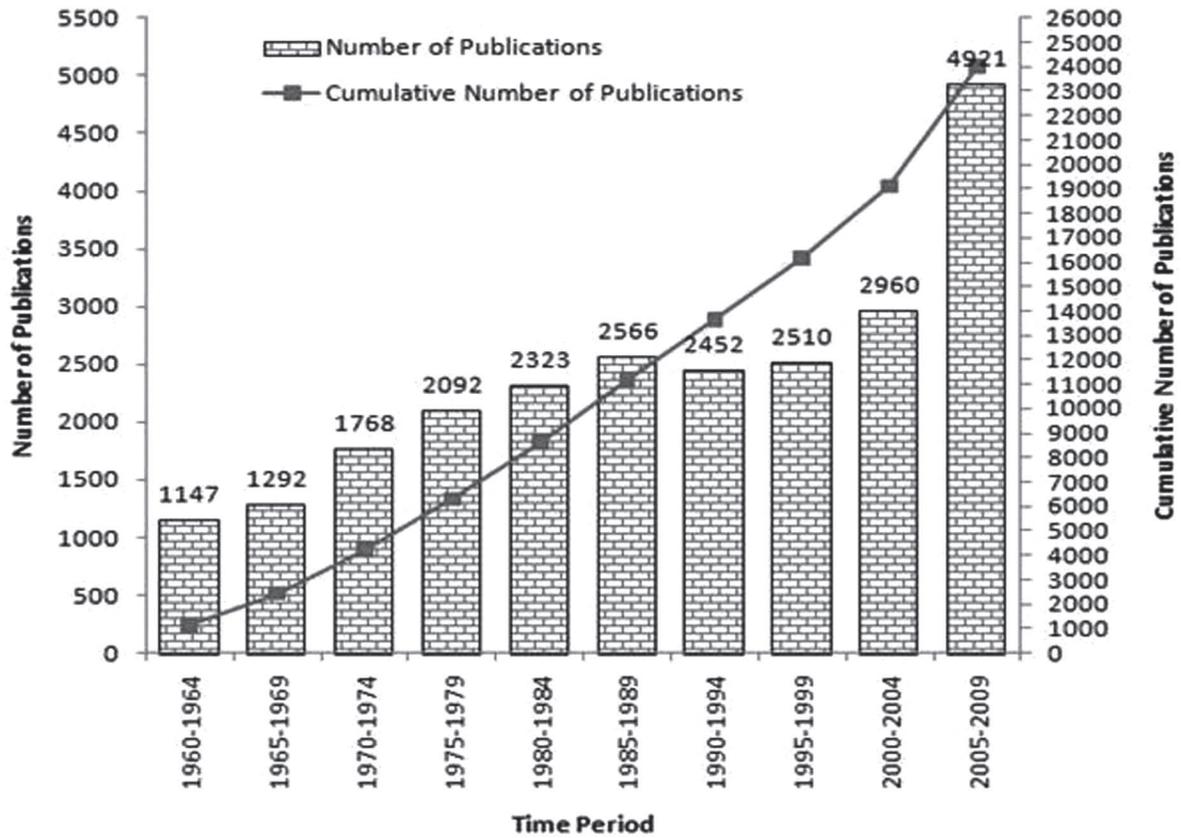


Figure 2. Growth of Psoriasis literature during 1960-2009.

published by each journal in the field (Table 3). Table 3 presents the overall coverage of the journals and the number of articles published by them. The table also presents the data for cumulative number of journals, cumulative percentage of journals, log of cumulative citations to assess the distribution of Bradford plot.

On the basis of the distribution of journals and corresponding number of articles published by each journal, a three zone has been framed as per the Bradford conception. The distribution of these three zones is given in Table 4.

In context of present literature on Psoriasis, it is found that 11 journals constitute first zone have 8159 (33.95 %) articles, next zone with 74 journals have 7901 (32.88 %) articles and much larger group of 2054 journals have 7971 (33.17 %) articles. Bradford postulated the division into three equal zones of one third article is each zone.

Based on the Bradford law, each zone should follow a linear geometric expression in the form of $1 : n : n^2$. On analysis of the data, it is found that the literature on Psoriasis does not follow this rule and each zone represents the Bradford expression as $11 : 74 : 2054$ which does not fit into the expression. The first zone, which is represented as nucleus zone have 11 journals and the multiplier value $n=17.27$

(the mean value) is expressed as:

$$11 : 11 \times 17.27 : 11 \times (17.27)^2 :: 1 : n : n^2$$

$$11 : 189.97 : 3280.78 \gg 3481.75$$

$$\text{Percentage error} = \frac{3481.75 - 2143}{2143} \times 100 = 62.47\%$$

On the basis of this calculation, it is found that the percentage error is very high, and the data of Psoriasis literature does not fit the Bradford expression. Cline²⁹ stated that if any group of data which have smaller percentage error can adhere the Bradford law. Therefore, to verify the Bradford law on Psoriasis literature it is decided to check its compatibility with Leimkuhler model.

5.3 Verification of Bradford Law through Leimkuhler Model

Bradford law's of scattering has been widely used to study the distribution of literature throughout the globe. According to this law, there are small number of journals which produce maximum number of literature, constitutes a nucleus of core journals. There is various variant interpretation of Bradford law. These variant forms were discussed by Leimkuhler. For this study both the model of Bradford as well as Leimkuhler were tested to justify the scattering of the literature in Psoriasis.

$$A = 24031 \text{ (Total number of articles on psoriasis)}$$

Table 2. Ranking of most productive journals on Psoriasis research, 1960-2009

S. No.	Journal title	No. of publication	(%)
1.	<i>British Journal of Dermatology</i>	2052	8.54 %
2.	<i>Journal of Investigative Dermatology</i>	1247	5.19 %
3.	<i>Journal of the American Academy of Dermatology</i>	1217	5.06 %
4.	<i>Archives of Dermatology</i>	1066	4.44 %
5.	<i>Acta Dermato Venereologica</i>	926	3.85 %
6.	<i>Vestnik Dermatologii I Venerologii</i>	850	3.54 %
7.	<i>Archives of Dermatological Research</i>	627	2.61 %
8.	<i>International Journal of Dermatology</i>	574	2.39 %
9.	<i>Hautarzt</i>	470	1.96 %
10.	<i>Clinical and Experimental Dermatology</i>	446	1.86 %
11.	<i>Journal of the European Academy of Dermatology and Venereology</i>	415	1.73 %
12.	<i>H G Zeitschrift Fur Hautkrankheiten</i>	409	1.70 %
13.	<i>Dermatologica</i>	384	1.60 %
14.	<i>Dermatology</i>	373	1.55 %
15.	<i>Cutis</i>	360	1.50 %
16.	<i>Annales De Dermatologie Et De Venereologie</i>	356	1.48 %
17.	<i>Journal of Dermatological Treatment</i>	321	1.34 %
18.	<i>Przegląd Dermatologiczny</i>	310	1.29 %
19.	<i>Giornale Italiano Di Dermatologia E Venereologia</i>	305	1.27 %
20.	<i>Journal of Dermatology</i>	301	1.25 %
21.	<i>Dermatologische Monatsschrift</i>	276	1.15 %
22.	<i>Lancet</i>	276	1.15 %
23.	<i>Journal of Rheumatology</i>	257	1.07 %
24.	<i>Aktuelle Dermatologie</i>	221	0.92 %
25.	<i>Annals of the Rheumatic Diseases</i>	209	0.87 %
26.	<i>European Journal of Dermatology</i>	209	0.87 %
27.	<i>Actas Dermo Sifiliograficas</i>	208	0.87 %
28.	<i>British Medical Journal</i>	205	0.85 %
29.	<i>Journal of Dermatological Science</i>	199	0.83 %
30.	<i>Acta Dermato Venereologica Supplement</i>	196	0.82 %
31.	<i>Nouvelles Dermatologiques</i>	195	0.81 %
32.	<i>Indian Journal of Dermatology Venereology and Leprology</i>	182	0.76 %
33.	<i>Drugs of the Future</i>	182	0.76 %
34.	<i>Cesko Slovenska Dermatologie</i>	172	0.72 %
35.	<i>Clinics in Dermatology</i>	172	0.72 %
36.	<i>Experimental Dermatology</i>	170	0.71 %
	Other Journals	7693	32.01 %
	Total	24031	100 %

Table 3. Citation and citing journals in Psoriasis research, 1960-2009

Rank	Number of journals	Cumulative no. of journals	No. of publications	Total no. of publications	Cumulative total	Log	Publication (%)	Journals (%)
1	1	1	1777	1777	1777	0.87	7.39 %	0.05 %
2	1	2	973	973	2750	1.06	11.44 %	0.09 %
3	1	3	964	964	3714	1.19	15.46 %	0.14 %
4	1	4	917	917	4631	1.28	19.27 %	0.19 %
5	1	5	753	753	5384	1.35	22.40 %	0.23 %
6	1	6	696	696	6080	1.40	25.30 %	0.28 %
7	1	7	520	520	6600	1.44	27.46 %	0.33 %
8	1	8	430	430	7030	1.47	29.25 %	0.37 %
9	1	9	401	401	7431	1.49	30.92 %	0.42 %
10	1	10	372	372	7803	1.51	32.47 %	0.47 %
11	1	11	356	356	8159	1.53	33.95 %	0.51 %
12	1	12	339	339	8498	1.55	35.36 %	0.56 %
13	1	13	322	322	8820	1.56	36.70 %	0.61 %
14	1	14	312	312	9132	1.58	38.00 %	0.65 %
15	1	15	311	311	9443	1.59	39.30 %	0.70 %
16	1	16	297	297	9740	1.61	40.53 %	0.75 %
17	1	17	249	249	9989	1.62	41.57 %	0.79 %
18	1	18	237	237	10226	1.63	42.55 %	0.84 %
19	1	19	228	228	10454	1.64	43.50 %	0.89 %
20	1	20	223	223	10677	1.65	44.43 %	0.93 %
21	1	21	209	209	10886	1.66	45.30 %	0.98 %
22	1	22	205	205	11091	1.66	46.15 %	1.03 %
23	1	23	204	204	11295	1.67	47.00 %	1.07 %
24	1	24	197	197	11492	1.68	47.82 %	1.12 %
25	1	25	165	165	11657	1.69	48.51 %	1.17 %
26	1	26	151	151	11808	1.69	49.14 %	1.21 %
27	1	27	140	140	11948	1.70	49.72 %	1.26 %
28	1	28	137	137	12085	1.70	50.29 %	1.31 %
29	1	29	135	135	12220	1.71	50.85 %	1.35 %
30	1	30	131	131	12351	1.71	51.40 %	1.40 %
31	1	31	120	120	12471	1.72	51.90 %	1.45 %
32	1	32	116	116	12587	1.72	52.38 %	1.49 %
33	1	33	112	112	12699	1.72	52.84 %	1.54 %
34	1	34	106	106	12805	1.73	53.29 %	1.59 %
35	1	35	102	102	12907	1.73	53.71 %	1.63 %
36	1	36	99	99	13006	1.73	54.12 %	1.68 %
37	1	37	98	98	13104	1.74	54.53 %	1.73 %
38	1	38	97	97	13201	1.74	54.93 %	1.77 %
39	2	40	94	188	13389	1.75	55.72 %	1.87 %
40	1	41	93	93	13482	1.75	56.10 %	1.91 %

Rank	Number of journals	Cumulative no. of journals	No. of publications	Total no. of publications	Cumulative total	Log	Publication (%)	Journals (%)
41	1	42	89	89	13571	1.75	56.47 %	1.96 %
42	1	43	87	87	13658	1.75	56.83 %	2.01 %
43	1	44	83	83	13741	1.76	57.18 %	2.05 %
44	2	46	81	162	13903	1.76	57.85 %	2.15 %
45	3	49	80	240	14143	1.77	58.85 %	2.29 %
46	1	50	78	78	14221	1.77	59.18 %	2.33 %
47	1	51	72	72	14293	1.77	59.48 %	2.38 %
48	1	52	71	71	14364	1.78	59.77 %	2.43 %
49	2	54	70	140	14504	1.78	60.36 %	2.52 %
50	1	55	67	67	14571	1.78	60.63 %	2.57 %
51	1	56	66	66	14637	1.78	60.91 %	2.61 %
52	1	57	65	65	14702	1.79	61.18 %	2.66 %
53	1	58	62	62	14764	1.79	61.44 %	2.71 %
54	1	59	61	61	14825	1.79	61.69 %	2.75 %
55	1	60	59	59	14884	1.79	61.94 %	2.80 %
56	1	61	58	58	14942	1.79	62.18 %	2.85 %
57	2	63	56	112	15054	1.80	62.64 %	2.94 %
58	1	64	55	55	15109	1.80	62.87 %	2.99 %
59	3	67	54	162	15271	1.80	63.55 %	3.13 %
60	1	68	52	52	15323	1.80	63.76 %	3.17 %
61	2	70	50	100	15423	1.81	64.18 %	3.27 %
62	2	72	48	96	15519	1.81	64.58 %	3.36 %
63	1	73	46	46	15565	1.81	64.77 %	3.41 %
64	1	74	44	44	15609	1.81	64.95 %	3.45 %
65	1	75	43	43	15652	1.81	65.13 %	3.50 %
66	4	79	42	168	15820	1.82	65.83 %	3.69 %
67	2	81	41	82	15902	1.82	66.17 %	3.78 %
68	2	83	40	80	15982	1.82	66.51 %	3.87 %
69	2	85	39	78	16060	1.82	66.83 %	3.97 %
70	1	86	38	38	16098	1.83	66.99 %	4.01 %
71	3	89	37	111	16209	1.83	67.45 %	4.15 %
72	3	92	36	108	16317	1.83	67.90 %	4.29 %
73	2	94	35	70	16387	1.83	68.19 %	4.39 %
74	2	96	34	68	16455	1.84	68.47 %	4.48 %
75	4	100	33	132	16587	1.84	69.02 %	4.67 %
76	2	102	32	64	16651	1.84	69.29 %	4.76 %
77	3	105	31	93	16744	1.84	69.68 %	4.90 %
78	2	107	30	60	16804	1.84	69.93 %	4.99 %
79	8	115	29	232	17036	1.85	70.89 %	5.37 %
80	5	120	28	140	17176	1.85	71.47 %	5.60 %
81	2	122	27	54	17230	1.86	71.70 %	5.69 %
82	4	126	25	100	17330	1.86	72.12 %	5.88 %

Rank	Number of journals	Cumulative no. of journals	No. of publications	Total no. of publications	Cumulative total	Log	Publication (%)	Journals (%)
83	5	131	24	120	17450	1.86	72.61 %	6.11 %
84	6	137	23	138	17588	1.86	73.19 %	6.39 %
85	3	140	22	66	17654	1.87	73.46 %	6.53 %
86	3	143	21	63	17717	1.87	73.73 %	6.67 %
87	10	153	20	200	17917	1.87	74.56 %	7.14 %
88	6	159	19	114	18031	1.88	75.03 %	7.42 %
89	5	164	18	90	18121	1.88	75.41 %	7.65 %
90	10	174	17	170	18291	1.88	76.11 %	8.12 %
91	11	185	16	176	18467	1.89	76.85 %	8.63 %
92	12	197	15	180	18647	1.89	77.60 %	9.19 %
93	16	213	14	224	18871	1.90	78.53 %	9.94 %
94	17	230	13	221	19092	1.90	79.45 %	10.73 %
95	21	251	12	252	19344	1.91	80.50 %	11.71 %
96	25	276	11	275	19619	1.91	81.64 %	12.88 %
97	20	296	10	200	19819	1.92	82.47 %	13.81 %
98	33	329	9	297	20116	1.92	83.71 %	15.35 %
99	29	358	8	232	20348	1.93	84.67 %	16.71 %
100	32	390	7	224	20572	1.93	85.61 %	18.20 %
101	55	445	6	330	20902	1.94	86.98 %	20.77 %
102	75	520	5	375	21277	1.95	88.54 %	24.27 %
103	130	650	4	520	21797	1.96	90.70 %	30.33 %
104	197	847	3	591	22388	1.97	93.16 %	39.52 %
105	347	1194	2	694	23082	1.98	96.05 %	55.72 %
106	949	2143	1	949	24031	2.00	100.00 %	100.00 %

Table 4. Scattering of journals and citation in Bradford zone

Zones	No. of journals	journals (%)	No. of publications	publications (%)	Multiplier
1	11	0.51 %	8159	33.95 %	-
2	74	3.45 %	7901	32.88 %	6.73
3	2054	96.03 %	7971	33.17 %	27.81
All Zones	2143		24031	100 %	17.27 (Mean value)

$y_m = 1777$ (Number of items in most productive source)
 $T = 2143$ (Total number of journals)
 $p = 3$ (Number of zones in which the data has to be divided)
 $y_0 = A/p = 24031/3 = 8010.34 = 8010$ (approx.)
 $k = (1.781 \times Y_m)^{1/p} = (1.781 \times 1777)^{1/3}$
 $= (3164.837)^{1/3} = 14.6819514 = 15$ (approx.)
 $r_0 = T(k-1)/(k^{p-1}) = 2143 (15-1)/(15^{3-1})$
 $= 30002/3374 = 8.892116 = 9$ (approx.)
 $a = y_0/\log k = 8010/\log 15 = 8010/1.17609125906$
 $= 6810.696 = 6811$ (approx.)
 $b = k-1/r_0 = 15-1/9 = 15-0.11 = 14.89 = 15$

Based on this calculation the tabulation of the data can be arranged as given in Table 5.

Table 5 shows that number of journals in the nucleus is 9 and the mean value of Bradford multiplier is 14.91. Therefore, Bradford distribution is written as:

$$9 : 9 \times 14.91 : 9 \times (14.91)^2 \quad \therefore 1 : n : n^2$$

i.e., $9 : 134.19 : 2000.77 \gg 2143.96$

$$\text{Percentage of error} = \frac{2143.96 - 2143}{2143} \times 100 = 0.045 \%$$

Thus, one can notice that the percentage error in this case is negligible, and the number of journals publishing psoriasis literature is increased by 14.91,

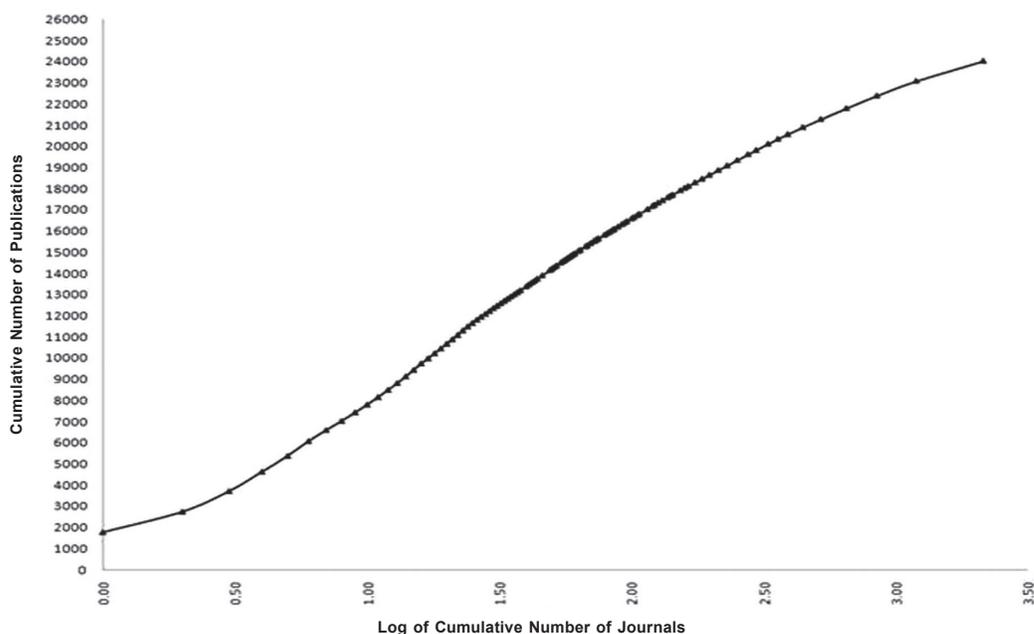


Figure 3. Bradford distribution of Psoriasis literature, 1960-2009.

Table 5. Redistribution of scattering of journals and citations over Bradford zones

Zone	No. of journals (%)	No. of publication (%)	Multiplier
1	9 (0.42 %)	7431 (30.92 %)	
2	134 (6.25 %)	8221 (34.21 %)	14.89
3	2000 (93.33 %)	8379 (34.87 %)	14.93
All Zones	2143 (100 %)	24031 (100 %)	14.91

the new Bradford multiplier. The Bradford constant was calculated from the distribution of journals in 3 zones according to Bradford model (Table 5). In the graphic formulation of Bradford-Zipf plot (Fig. 3) the behavior can be seen of scientific publications going as an ascending line.

6. CONCLUSIONS

Through this study it is found that there were 24031 articles available during the period of study which deals with different area of psoriasis. These articles have been published by 2143 journals. As per theoretical aspects of the Bradford law, there were 11 journals (one third of journals—as per Bradford zone) should have published maximum number of articles, does not hold good and shown high percentage error. After adopting the alternatives such as the model proposed by Leimkuhler, it is found that there were nine journals which constitute the nucleolus zone and produced maximum number of articles. So, it can be concluded that the theoretical aspect of Bradford law of scattering is supplemented by its alternatives. On this basis, the ranked list of most productive journal shows that, *British Journal of Dermatology* is the most productive journal. This study is an attempt to analyse the patterns of publication in

the field of Psoriasis. This study shall be helpful to the library and information science community to choose right journal in case of medical science dealing with the disease like psoriasis. This study shall also be helpful to the medical scientists who are working in the area of psoriasis or dermatology who wish to publish their research in this area.

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