



# Mapping of Celiac Disease Research Literature: A Scientometric Approach

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

The study aims to evaluate the celiac disease research publications in the Web of Science database from the years 2015 to 2018. The keyword used the term "Celiac Disease" from the Web of Science database collects the records. A total of 4147 records were collected from this study of Celiac disease. The highest productive year is 2017 with 1062 records (25.61%) and the last position of papers was published 1016(24.50%) in the year is 2016. The table provides the value of the average RGR of publications, which decreased from 6.93537 in 2015 to -0.01997 in 2018. At the same time, the value of doubling time (DT) of publications increased from 0.099923 (2015) to -34.6983 (2018). It has shown that the degree of collaboration range from zero to 0.95. The most prolific author Lebowhl B occupied in first position 107(2.58%) records. The most productive country USA placed in the topmost position with 1149(27.71%) records. The authorship pattern of celiac disease research this table notes that the majority of the articles were contributed by four authors 549(13.24%). These three authors were contributed 538(12.97%) second position of papers in this study. The first position of the journal is Gastroenterology published records with 260(6.27%). The language-wise distributions of published records in Celiac disease research in this present study. The most productive language is English with 4032(97.23%), and the last

productivity language is Icelandic with 1(0.02%) publications. The Study concludes that Celiac Disease Research lags in this research, so come forward with financial institutions to encourage researchers and scientists to develop celiac research.

**Keywords:** *Scientometric; degree of collaboration; celiac disease; authorship pattern; relative growth rate; doubling time; prolific authors.*

## 1. INTRODUCTION

Scientometric is a branch of science, "Science of Science". Scientometric is a scientific discipline that makes reproductive measurements of scientific activity. Nowadays, science is one of the truly interdisciplinary research fields that has expanded to almost all scientific disciplines [1]. In this celiac disease study, the author discusses, analyzes the study and uses a variety of scientific methodology tools and technologies, such as the degree of collaboration for the paper. Among them, Celiac disease is one of the most common autoimmune diseases in the world. This disease is affecting nearly 1% of the people in the United States. Celiac disease is called celiac sprue or gluten-sensitive enteropathy is a digestive. These diseases damage that introduces to the small intestine after foods with gluten are eaten. Gluten is a form of protein was found in some grains. Celiac disease is improved at any time in life; from affect adulthood, and more women than men being diagnosed. Celiac disease is many of the symptoms is created, but one of the most difficult of diagnosis problems. These diseases trigger some type of autoimmune disease. The simple treatment for the celiac disease patient is only a lifelong gluten-free diet taking of our life [2]. Scientometric analysis of literature provides the research in the field is concerned. The present study analyzes the publication trends of Celiac Disease research is applying Scientometric indicators.

## 2. REVIEW OF LITERATURE

Previous studies identified that there is related research has been reported in many disciplines. Antony and Selvaraju [3] present a study analyze Price Square Root Law, Pareto Principle, Publication Efficiency Index, Modified Collaborative coefficient, and Application of Lotka's Law in the Geese Literature of India 94 publications retrieved in the Scopus database from 2008 to 2017. Arora et al. [4] examined the research undertaken in Indian medical colleges and concluded that the high position of the 88 Indian medical colleges receiving research

grants from ICMR did not produce any research paper in 1991. This paper is only 10% of the projects funded to Indian medical colleges on the publications in indexed journals. Bala and Singh [5] in this study discussed Scientometric as the Science of measuring and analyzing Science. This study reveals that a single author contributed 18 (5.7%) while Multi authors<sup>2</sup> provided the rest of 162 (51.3%) articles. Bansal [6] Consist of this study is an analysis of 14317 world papers in celiac disease research. This study data was retrieved from the Scopus database for the period 2005-14. The celiac disease research has an annual average growth rate of 5.20%. This study using the citation impact factor is 12.53. The top 15 productive countries with the largest share of the U.S.A were 21.40%. The most productive keyword is gluten-free diet was 18.47% used in this study. Bhardwaj [7] conducted a study on bibliometric analysis on celiac disease research during 2001-2012. Celiac disease is celiac sprue or gluten-sensitive enteropathy is an autoimmune disorder. The data for the study were collected from Scopus online database. The total records for 14356 papers were published during the period. The study uses some parameters such as type of publications in celiac disease research, the context of different subjects, different population groups, etc. During the study period 2001-2012, a total of 14356 records and 178133 citations received the publications were transferred to MS Excel 2010. Clarence and Raja [8] researched to analyze the author's productivity of Arthropathy research on a scientometric analysis. The data was retrieved from the Web of Science database. A total of 4221 records were published from 2010 to 2020. The study used to Scientometric and Bibliometric Laws of Lotka's law, Price Law, Pareto Principals. The result of Lotka's law is not applicable in the study. Clarence and Raja [9] conducted the study examines the global publications of Web of Science core collection publications 3722 on Scleroderma published in 2015-2020, using a sequence of quantitative indicators. The global release of "Scleroderma" recorded a Single author was 173 (0.61%) of total publications, and the multiple authors for 28401 (99.39%). This should provide new

insights into the future development of various subtypes of scleroderma. Gupta and Dhawan [10] examined the E-Books as a Scientometric analysis during 1993-2018. Electronic books can be accessed through a networking system that can be retrieved whenever we require. They studied several parameters such as citations to papers constituting the global literature on the subject, growth, and distribution of world literature on the electronic books, distribution of publications output by broad subject areas, etc. This study collects the data from were Scopus database. A total of 2116 records were published during the period. The Country-wise productivity of publication of topmost country is the USA was 38.42 per cent global publication. Jeeja and Raja [11] analyzed the Scientometric Tools and a technique tested from a global perspective has been analyzed since the publication of the Nanophysics Research. A total of 1914 records were collected from the Web Science Database during the period from 2010-2017. Vellaichamy and Jeyshankar [12] analyzed the study of Scientometric methods for evaluating haemophilia research during the period from 2003-2017. Data were collected from the database was Scopus database. A total of 13503 records were published in haemophilia research. Uma Devi and Thirumal [13] as stated by the author, have discussed the trends of Liver Disease research from 2012 to 2017, these data were collected from the web of science. And the purpose of this study is to investigated source wise, year-wise, authorship, and country-wise research. The study output is the article got first place in various forms of sources in 2016, and India has the highest publication.

### 2.1 The Objective of the Study

1. To identify Year Wise distribution of Documents
2. To find out the Authorship pattern
3. To analysis the Relative Growth Rate and doubling Time
4. To find out the most productive Journals
5. To find out the Degree of Collaboration
6. To identify the Country-wise distribution of Celiac Disease research output

7. To analysis the top ten Ranked Institution

### 3. METHODOLOGY

This study aimed to find the growth of publication productivity of Celiac Disease Research for the period of 2015-2018. For this purpose, 4147 records were downloaded from the Web of Science database. In this celiac disease study, the author discusses, analyzes the study and uses a variety of scientific methodology tools and technologies, such as the degree of collaboration for the paper. And analysis author wise distribution, Journal, Publication year, Country-wise and Institution-wise, etc. To analysis, the collected data, HistCite Software is used. Based on the string, 4147 records were tabulated and investigated by Microsoft Excel 2010 format using this study.

### 4. RESULTS AND DISCUSSION

#### 4.1 Research Output on Celiac Disease Research

It was found that a total of 4147 papers were published during 2015-2018, is celiac research. Table 1 shows that the year-wise distribution of documents in the research. It shows that the highest numbers of publications 1062(25.61%) were in 2017. The second highest position of papers was published 1041(25.10%) in the year 2018. The third position of publication was 1028(24.79%) the year is 2015, and the last position of papers was published 1016(24.50%) in the year is 2016.

The relative growth rate and doubling time of articles were discussed in the table. The table provides the value of the average RGR of publications, which decreased from 6.93537 in 2015 to -0.01997 in 2018. At the same time, the value of doubling time (DT) of publications increased from 0.099923 (2015) to -34.6983 (2018).

**Table 1. Year-wise distribution of Documents**

S: No	Publication Year	Records	Percentage	LCS	GCS
1	2015	1028	24.79	3052	12564
2	2016	1016	24.50	1279	7799
3	2017	1062	25.61	795	5909
4	2018	1041	25.10	213	2391
<b>Total</b>		<b>4147</b>	<b>100</b>	-	-

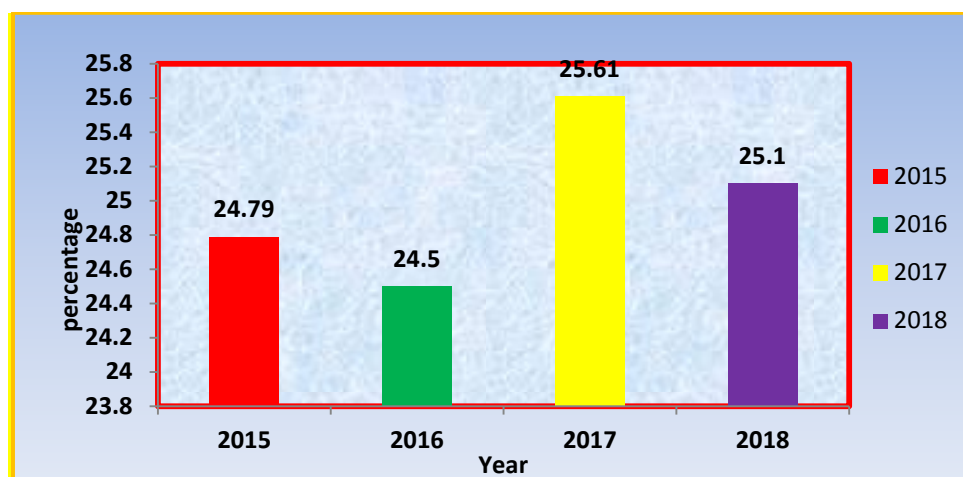


Fig. 1. Year-wise distribution of Documents

Table 2. Relative Growth Rate and Doubling Time of Year-Wise Distribution

S. No	Publication Year	Records	Cumulative	W1	W2	RGR	DT
1	2015	1028	1028	0	6.93537	6.93537	0.099923
2	2016	1016	2044	6.93537	6.923629	-0.01174	-59.0198
3	2017	1062	3106	6.923629	6.967909	0.044281	15.6502
4	2018	1041	4147	6.967909	6.947937	-0.01997	-34.6983

Table 3. Degree of collaboration

S.No	Year	NS	NM	NM+NS	DC
1	2015	64	964	1028	0.94
2	2016	61	957	1018	0.94
3	2017	47	1015	1062	0.96
4	2018	52	987	1039	0.95
<b>Total</b>		<b>224</b>	<b>3923</b>	<b>4147</b>	<b>0.95</b>

Table 3 shows the collaborative authorship of the articles published during the period of study. The degree of collaboration is celiac disease research in this study. To determine the degree of collaboration in quantitative terms, the following formula given by K. Subramanyam (1983) was used for measuring collaboration. It has shown that the degree of collaboration range from zero to 0.95.

The formula is,

$$C = \frac{NM}{NM + NS}$$

C= Degree of Collaboration in a discipline or Extent of Collaboration in a discipline  
 NM= Number of Multiple authored papers  
 NS= Number of Single-authored papers

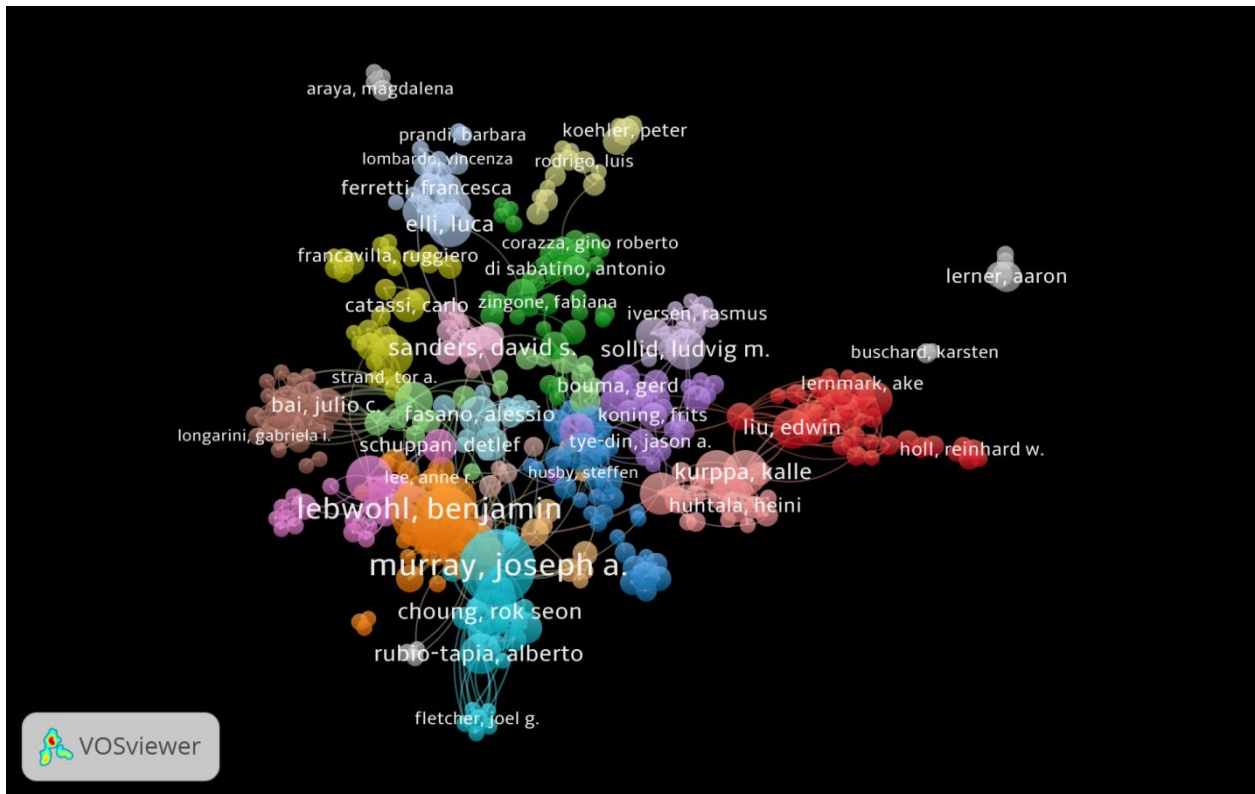
Table 4 Fig. 2 shows that the top 10 authors of the country level of celiac research publications.

It could be noted that the Lebwohl B occupied first position 107(2.58%) compared to Murray JA in second position 106(1.56%) followed by Green PHR, Ludvigsson JF, and others. The tenth author is Maki M occupied the last position in the tables, 36(0.87%).

This table shows that the authorship pattern of celiac disease research this table notes that the majority of the articles are contributed by four authors 549(13.24%). These three authors are contributed 538(12.97%) second position of papers in this study. Five authors and six authors contributed papers occupying third and fourth in the order 490(11.82%) and 461(11.12%) respectively. More than ten authors occupy the fifth position with 441(10.63%), and two authors occupy the sixth position was 431(10.39%). And balance authors followed by the next position are respectively.

**Table 4. Author wise distribution of Publications (Top 10)**

S: No	Author	Records	Percentage	LCS	GCS
1	Lebwohl B	107	2.58	187	599
2	Murray JA	106	2.56	320	716
3	Green PHR	82	1.98	210	714
4	Ludvigsson JF	68	1.64	144	680
5	Elli L	52	1.25	174	513
6	Sanders DS	46	1.11	200	622
7	Leffler DA	44	1.06	269	639
8	Kaukinen K	38	0.92	158	355
9	Kurppa K	38	0.92	105	273
10	Maki M	36	0.87	104	281



**Fig. 2. Co-Occurrence with Authors**

**Table 5. Authorship pattern**

S.No	Authors	Contribution	Cumulative	Percentage	Cumulative %
1	Single	224	224	5.40	5.40
2	Two	431	655	10.39	15.79
3	Three	538	1193	12.97	28.77
4	Four	549	1742	13.24	42.01
5	Five	490	2232	11.82	53.82
6	Six	461	2693	11.12	64.94
7	Seven	384	3077	9.26	74.20
8	Eight	284	3361	6.85	81.05
9	Nine	188	3549	4.53	85.58
10	Ten	157	3706	3.79	89.37
11	More than 10	441	4147	10.63	100.00



Fig. 3. Authorship pattern

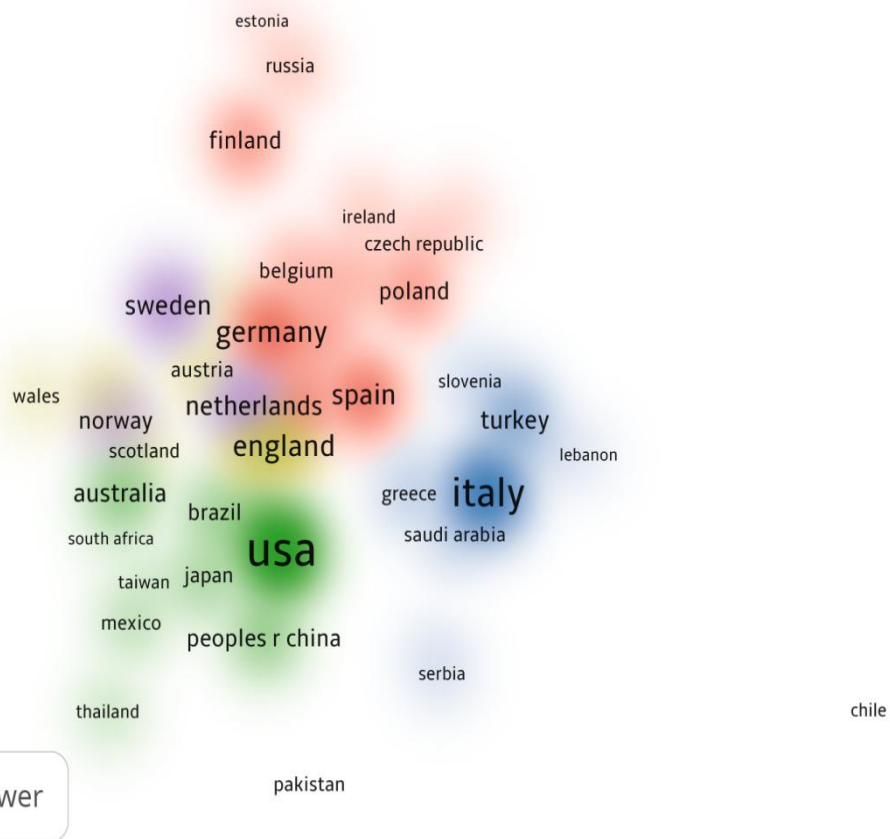


Fig. 4. Country-wise Analysis

**Table 6. Country-wise distribution of Celiac Disease research output (Top 10)**

S: No	Country	Records	Percentage	LCS	GCS
1	USA	1149	27.71	2081	11279
2	Italy	660	15.92	1223	5773
3	UK	314	7.57	644	4537
4	Germany	278	6.70	799	3374
5	Unknown	273	6.58	12	186
6	Spain	231	5.57	426	2409
7	Sweden	191	4.61	438	2352
8	Netherlands	185	4.46	392	2309
9	Canada	173	4.17	423	2006
10	Turkey	149	3.59	92	386

**Table 7. Document wise distribution of Articles**

S: No	Document Type	Records	Percentage	LCS	GCS
1	Article	2514	60.62	3981	19489
2	Review	614	14.81	1121	8169
3	Meeting Abstract	596	14.37	8	32
4	Editorial Material	187	4.51	117	408
5	Letter	181	4.36	85	246
6	Article; Proceedings Paper	38	0.92	20	236
7	Correction	14	0.34	0	2
8	Article; Book Chapter	6	0.14	0	4
9	News Item	5	0.12	0	1
10	Review; Book Chapter	5	0.12	7	63
11	Reprint	1	0.02	0	5
12	Review; Retracted Publication	1	0.02	0	8

The country-wise distribution of celiac disease research output is given in Table 6. The USA placed in the topmost position with 1149(27.71%) records and Italy in the second position with 660(15.92%). The UK is in the third position with 314(7.57%), and other country publications are as follows.

Table 7 shows that the document wise distribution of publications. Articles cover the most preferred type is 2514(60.62%), as Review were 614(14.81) records, as Meeting Abstract were 596(14.37%) of records, as Editorial

materials were 187(4.51) publications and other publication followed by other forms.

In this table is institution-wide research productive of Celiac disease research. It is noted that Unknown ranks first position in order by contributing 269 publications. Mayo Clin records the second rank with 132 publications. Columbia University records the third rank with 114 publications. Karolinska Institution and University Tampere are fourth and fifth rank with 93 and 75 records published. The publications of other Institutions are as follows.

**Table 8. Top Ranked Institution (Top 10)**

S: No	Institution	Records	Percentage	LCS	GCS
1	Unknown	269	6.49	12	186
2	Mayo Clin	132	3.18	355	1220
3	Columbia Univ	114	2.75	326	1343
4	KarolinskaInst	93	2.24	192	1097
5	Univ Tampere	75	1.81	333	966
6	Univ Oslo	73	1.76	296	984
7	Harvard Med Sch	70	1.69	143	776
8	Tampere UnivHosp	70	1.69	228	809
9	Univ Milan	66	1.59	134	902
10	Univ Naples Federico II	56	1.35	142	549

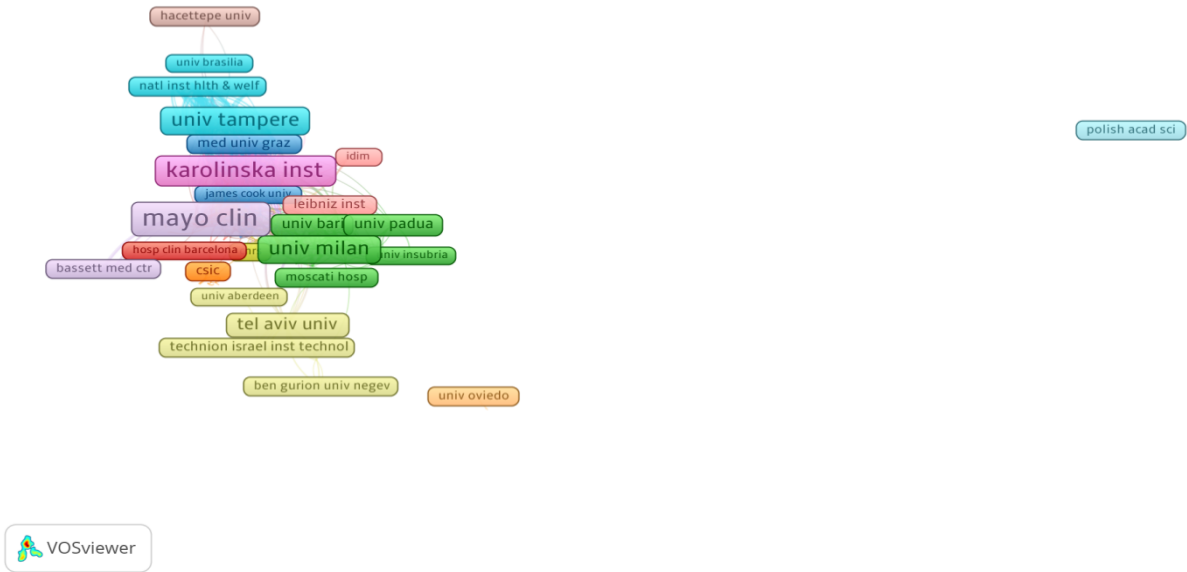


Fig. 5. Institution-wise analysis

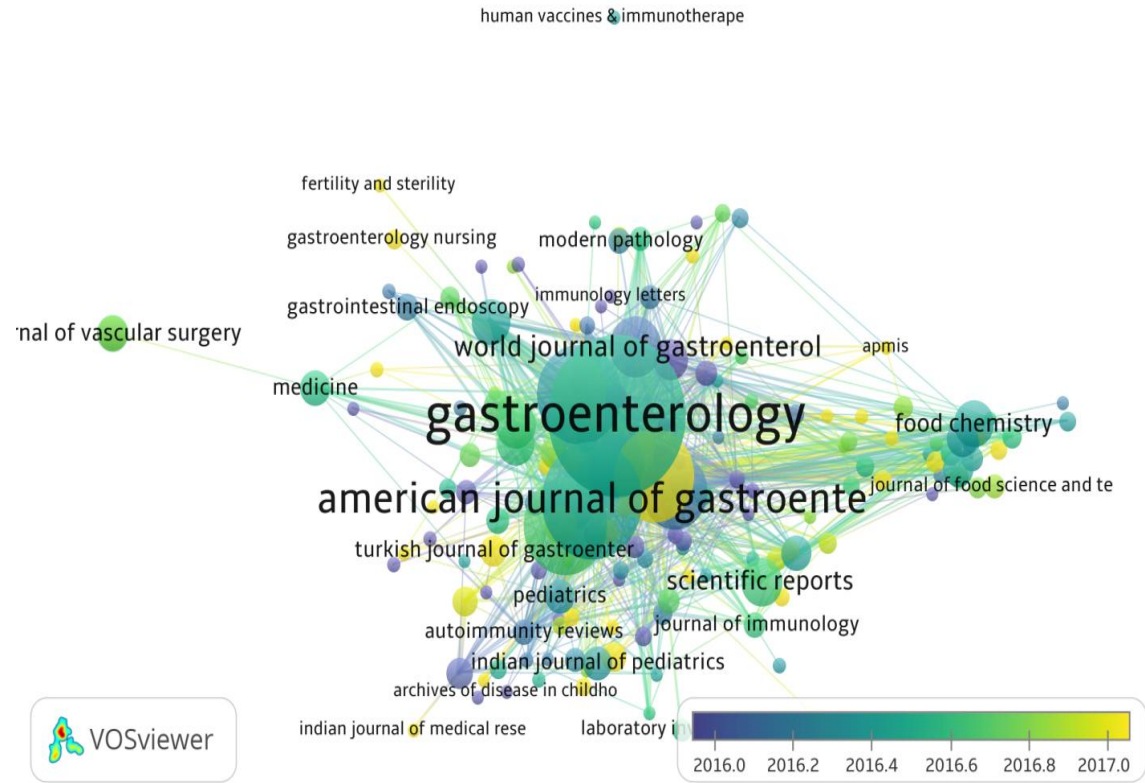


Fig. 6. Source-wise analysis



**Table 9. Journal wise distribution of Publications (Top 10)**

S: No	Journal	Records	Percentage	LCS	GCS
1	Gastroenterology	260	6.27	365	978
2	American Journal of Gastroenterology	151	3.64	257	708
3	Digestive and Liver Disease	115	2.77	100	276
4	Journal of Pediatric Gastroenterology and Nutrition	111	2.68	191	609
5	Nutrients	107	2.58	289	1099
6	Plos One	75	1.81	0	715
7	Clinical Gastroenterology and Hepatology	57	1.37	198	600
8	Digestive Diseases and Sciences	55	1.33	86	256
9	World Journal of Gastroenterology	52	1.25	146	493
10	Scientific Reports	35	0.84	0	239

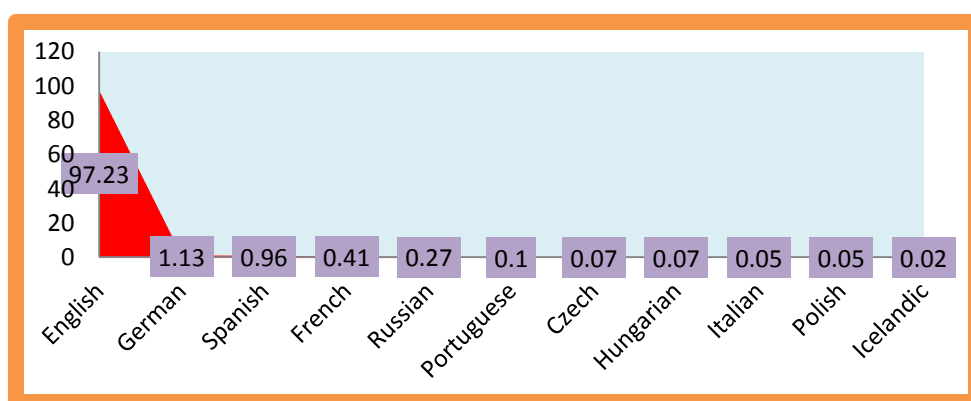
**Table 10. Language wise distribution of documents**

S: No	Language	Records	Percentage	LCS	GCS
1	English	4032	97.23	5314	28508
2	German	47	1.13	3	51
3	Spanish	40	0.96	12	48
4	French	17	0.41	4	21
5	Russian	11	0.27	4	14
6	Portuguese	4	0.10	0	3
7	Czech	3	0.07	2	5
8	Hungarian	3	0.07	0	10
9	Italian	2	0.05	0	1
10	Polish	2	0.05	0	2
11	Icelandic	1	0.02	0	0

Table 9 and Fig. 6 shows the Journal wise distribution of publications in celiac disease research. The first position of the journal is gastroenterology published records with 260(6.27%). The second position of the journal is the American Journal of Gastroenterology published records with 151(3.64%). Digestive and Liver Disease Journal is the third position of records with 115(2.77%). Journal of Pediatric Gastroenterology and Nutrition and Nutrient Journals are fourth and fifth positions of

published records with 111(2.68%) and 107(2.58%). The records of other journals are as follows.

Table 10 shows that the language wise distributions of published records in Celiac disease research in this present study. The most productive language is English with 4032(97.23%), and the last productive language is Icelandic with 1(0.02%).



**Fig. 7. Language wise distributions of documents**

## 5. CONCLUSION

This study revealed that 4147 papers had been published on Celiac Disease Research on 1123 Journals. It shows that from 2015 to 2018, the highest numbers of publications 1062(25.61%) were in 2017. Celiac disease research is the degree of collaboration range from zero to 0.95. "Journal of Gastroenterology", published records with 260(6.27%). It is noted that Unknown ranks first position in order by contributing 269 publications. Articles cover the most preferred type is 2514(60.62%). The most productive language is English with 4032(97.23%), and the last productive language is Icelandic with 1(0.02%). The highest articles were published in the year 2017 and the lowest in the year 2016. Celiac Disease Research lags in this research, so come forward with financial institutions to encourage researchers and scientists to develop celiac research.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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