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# Management of Hypothyroidism Research Publications: A Bibliometric Analysis

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## **Abstract**

*Endocrine and metabolic diseases are among the the most common contemporary human afflictions particularly in the United States and other developing countries like India and Srilanka. Hypothyroidism is due to the under activity of thyroid gland and results from its failure to secrete sufficient hormones into the blood stream. Hypothyroidism is a condition that reflects decreased concentrations of thyroid hormones due to any cause. This paper attempts to analyse management of hypothyroidism as reflected in publication output covered by Web of Science online database during 2018-2020 USA advanced with 156 (23.5 %) Articles and it occupies the first place in the European Continent. Italy, UK, China and France contributed nearly 100 Articles in this field. The challenge is how to best approach to increase the knowledge level thereby managing and preventing hypothyroidism.*

**Keyword:** Hypothyroidism, Management, Bibliometrics, Endocrinology, Publications

## **1. Introduction**

Non communicable diseases are major challenges of 21<sup>st</sup> century. The thyroid gland is situated in the front part of neck and its hormones are vital for normal metabolism. Regulating thyroid

function is a complex and important process that involves several factors including iodine and four thyroid hormones. Any abnormality in this intricate system of hormone synthesis and production can have far reaching consequences on health- hyperthyroidism being the most common of those. Endocrine-metabolic disorders affect millions of people worldwide and are having an increasingly negative impact upon the health of our society as a whole.

Hypothyroidism is a condition where there is deficiency of thyroxin, triiodothyronine or both. The symptoms of hypothyroidism includes tiredness, muscle cramps, joint aches, feeling cold, drowsy, weight gain, husky voice hair loss, depression and heavy menstrual flow. Among the various varieties of hypothyroidism, congenital hypothyroidism is probably the most important. it increases the risk for physical and mental problems. The best laboratory assessment of thyroid is a serum thyroid stimulating hormone test. Better knowledge and understanding of their thyroid disorder will encourage patients to be more compliant with the medications, follow up regularly and spread correct facts to their friends and fellow beings.

Thyroid disorders are the second most common endopathies found in pregnancy. it can cause multitude of complications such as birth defect goiter, heart problems, infertility and mental illness. the higher prevalence of hypothyroidism in the elderly population may be related to alterations in immune function with age. Understanding the symptoms of hypothyroidism and getting regular screening to ensure an early diagnosis will prevent the onset of complications.

## 2. **Objectives**

- A bibliometric analysis on hypothyroidism from 2018-2020 depicting the annual trends.
- Document forms retrieved in Hypothyroidism research publications
- Scholarly Output of Co-Authorship in hypothyroid publications
- Productive output of hypothyroid publications from top ten authors, countries/Institutions and journals.
- Most Influential Language and Keywords timeline view of hypothyroid Publications.

### 3. Methodology

The necessary information was gathered from Web of Science database for the period 2018-2020. It tends to be seen that almost 634 bibliographic records of contribution in field of Hypothyroidism over the time of 3 Years. The records were downloaded and analyzed by using the Histcite software applications as per the objectives of the study. The investigation plans to examine the push regions of research focus on management of hypothyroidism research. It is systematic in nature with the reasonable factual instruments applications in strengthening the empirical validity.

### 4. Data Analysis and Interpretations

This analysis covers the researcher's exploration yield on Hypothyroidism research publications at worldwide level.

**Figure -1 - Year wise Research Output of Hypothyroid Research**

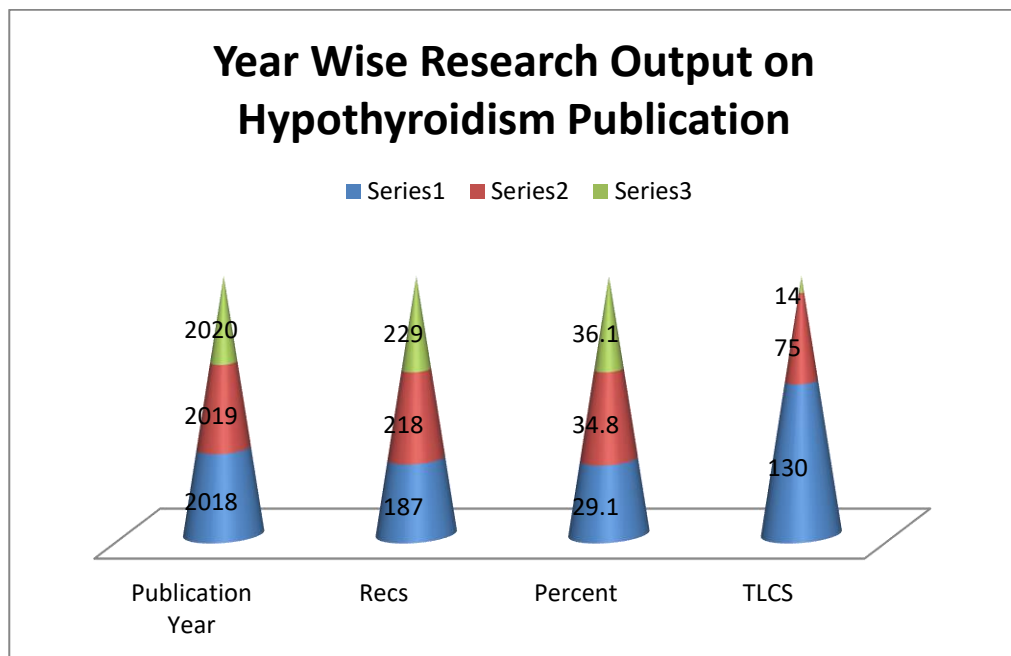


Figure 1 plots the annual trends of publications related to hypothyroidism. The year 2020 witness 36.1 % data increase whereas in the years 2018 contribution was only 29.1 and in 2019 34.8 %. There are many reasons for the rapid growth. Firstly, with the rapid development of technology, people were more likely to obtain massive data on hypothyroidism and its management. The growth and development in research publications in the field is well witnessed from this figure.

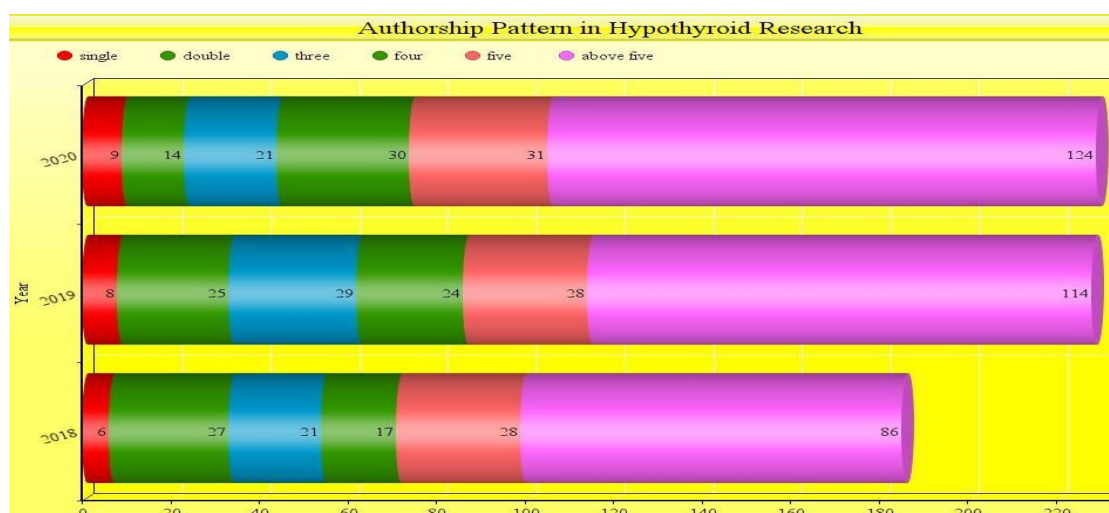
**Table-2 Sources wise output in Hypothyroid Research**

S.NO	Document Type	Recs	Percent	TLCS	TGCS
1	Article	457	68.9	173	1606
2	Review	156	23.5	40	726
3	Article; Early Access	22	3.3	0	4
4	Editorial Material	11	1.7	6	70
5	Review; Early Access	6	0.9	0	1
6	Article; Proceedings Paper	5	0.8	0	27
7	Meeting Abstract	3	0.5	0	0
8	Letter	2	0.3	0	0
9	Editorial Material; Early Access	1	0.2	0	0
	<b>Total</b>	-	<b>100.00</b>	-	-

document types were found in these 634 publications. The most frequent document type is article (457), accounting for 68.9 % of total publications. At the second position is Review (156), with a proportion of 23.5 %. Other document types including Article-Early Access (22), Editorial Material (11), Review-Early Access (6), Proceedings (5), Meeting Abstract (3) and so on.. Table 2 lists the numbers and proportions of various document types. All documents were downloaded on 8<sup>th</sup> January 2021.

**Table-3 Authorship pattern in Hypothyroid Research**

SL. NO	YEAR	SINGLE	DOUBLE	THREE	FOUR	FIVE	ABOVE FIVE	TOTAL
1	2018	6	27	21	17	28	86	183
2	2019	8	25	29	24	28	114	226
3	2020	9	14	21	30	31	124	217
<b>Total</b>		<b>23</b>	<b>66</b>	<b>71</b>	<b>71</b>	<b>87</b>	<b>318</b>	<b>634</b>



Co-authorship research is an important content of bibliometrics and the level of research collaboration is an index to assess the current status of research in a specific field. Table 3 shows that there are 634 hypothyroid publications between 2018 and 2020 (until 8<sup>th</sup> january, 2021). It can be seen that from 2018 the average number of authors per paper significantly exceeding. Through further examination, the sample found that 75% of articles are written using co-authorship.

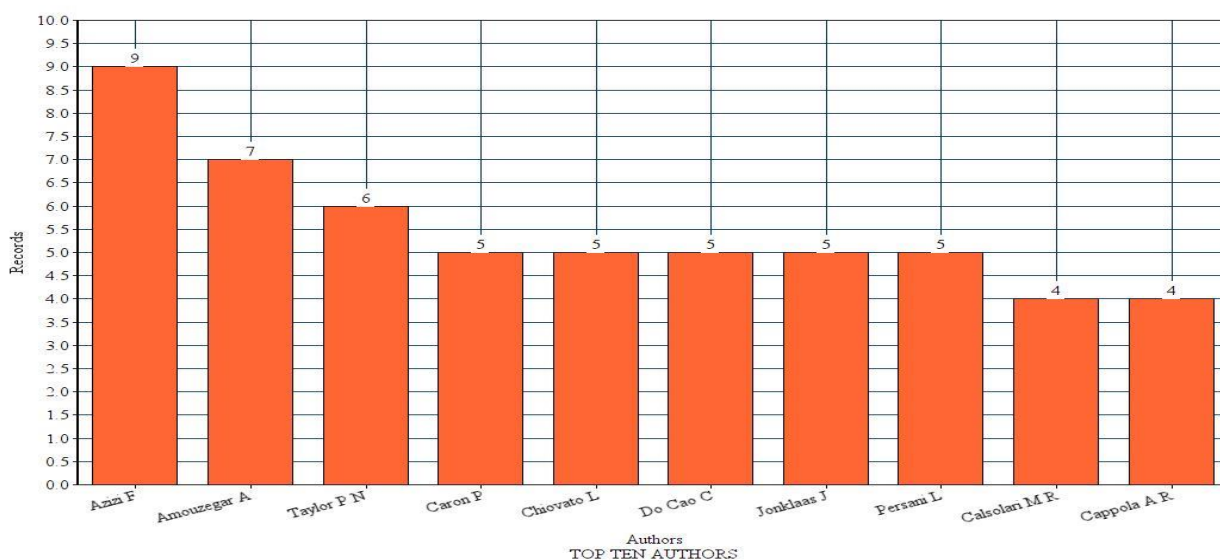
**Table-4 Top Ten Authors in Hypothyroid research**

SL. NO	Author	Recs	Percent	TLCS	TLCS/t	TLCSx	TGCS	TGCS/t	TLCR
1	Azizi F	9	1.4	22	7.833333	20	60	22.83333	4
2	Amouzegar A	7	1.1	7	2.833333	6	23	10.16667	2
3	Taylor PN	6	0.9	11	5	8	67	24.83333	3
4	Caron P	5	0.8	9	3.666667	5	42	17.83333	5
5	Chiovato L	5	0.8	9	3.166667	7	67	24	5
6	Do Cao C	5	0.8	10	4.166667	6	60	26.83333	5
7	Jonklaas J	5	0.8	14	4.833333	10	75	27.66667	3
8	Persani L	5	0.8	16	6.666667	12	56	22	2
9	Calsolari MR	4	0.6	2	0.666667	1	8	4	0
10	Cappola AR	4	0.6	10	3.5	7	65	24.66667	0

TLCS/t - Total Local Citation Score per year

TGCS/t - Total Global Citation Score per year

TLCR - Total Local Cited References



In this section, authors of the most cited articles by Hypothyroid research publications are studied and presented in Table 4. Azizi F represents 9 records with TGCS 60 and Amouzegar A with 7 records and TGCS 23. Taylor P N) has contributed 6 records with TGCS 67.

**Table-5 Top Ten Journals in Hypothyroid research**

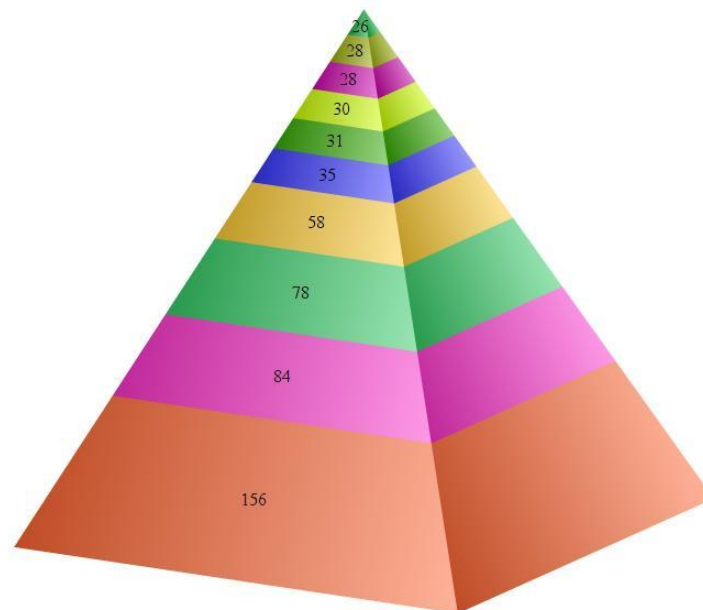
SL. NO	JOURNAL	RECS	PERCENT	TLCS	TLCS/t	TGCS	TGCS/t	TLCR
1	Thyroid	30	4.5	43	17.83333	232	104	21
2	Journal of Clinical Endocrinology & Metabolism	18	2.7	31	11.66667	127	49.33333	11
3	Endocrine	15	2.3	0	0	39	18.50049	15
4	Frontier in Endocrinology	15	2.3	0	0	20	8.166667	9
5	Archives of Endocrinology Metabolism	10	1.5	3	1	21	8.5	3
6	Hormone and Metabolic Research	10	1.5	3	1.166667	82	36.5	1
7	Best Practice & Research Clinical Endocrinology & Metabolism	9	1.4	6	2	29	10.33333	9
8	Endocrine Journal	9	1.4	1	0.5	16	8.166667	0
9	Endocrine Practice	9	1.4	3	1.333333	26	17.16667	4
10	Europine Journal of Endocrinology	8	1.2	9	4.333333	40	20.16667	3

Table 5 illustrates the distribution of core journals on Hypothyroidism study. The table shows THYROID has the highest record- 30 of 4.5 %, TGCS value (232) followed by JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM- 18 (2.7%) and TGCS 127 , ENDOCRINE & FRONTIERS IN ENDOCRINOLOGY 15 (2.3%) are the four leading publications respectively in the table.

**Table-6 Top Ten Country wise of hypothyroid research**

SL.NO	COUNTRY	RECS	PERCENT	TLCS	TGCS
1	USA	156	23.5	66	931
2	Italy	84	12.7	42	431
3	Peoples R China	78	11.8	8	179
4	UK	58	8.7	36	341
5	France	35	5.3	18	184
6	Japan	31	4.7	1	144
7	Brazil	30	4.5	5	101
8	Germany	28	4.2	13	171
9	Netherlands	28	4.2	24	225
10	Spain	26	3.9	12	100

■ USA   
 ■ ITALY   
 ■ CHINA   
 ■ UK   
 ■ FRANCE   
 ■ JAPAN   
 ■ BRAZIL   
 ■ GERMANY   
 ■ NETHERLANDS  
■ SPAIN





In terms of countries, Table 6 reveals that USA ranks at the top (156/323.5%) with majority of the publications output of hypothyroid research contribution .Italy (84/12.7%), China 78/11.8%), UK (58/8.7%), followed by France, Japan, Brazil, Germany, Netherlands and Spain respectively have published more than hundred articles.

**Table-7 Top ten Institutions wise of Hypothyroid Research**

SL.NO	INSTITUTION	RECS	PERCENT	TLCS	TGCS
1	<b>Mayo Clin</b>	<b>14</b>	<b>2.1</b>	<b>13</b>	<b>148</b>
2	<b>HarvardMed Sch</b>	<b>13</b>	<b>2</b>	<b>11</b>	<b>173</b>
3	<b>Sichuan Univ</b>	<b>11</b>	<b>1.7</b>	<b>0</b>	<b>77</b>
4	<b>Erasmus MC</b>	<b>10</b>	<b>1.5</b>	<b>10</b>	<b>47</b>
5	<b>Shahid Beheshti Univ Med Sci</b>	<b>10</b>	<b>1.5</b>	<b>22</b>	<b>66</b>
6	<b>Tel Aviv Univ</b>	<b>10</b>	<b>1.5</b>	<b>3</b>	<b>32</b>
7	<b>Univ Messina</b>	<b>10</b>	<b>1.5</b>	<b>4</b>	<b>48</b>
8	<b>Univ Milan</b>	<b>10</b>	<b>1.5</b>	<b>17</b>	<b>68</b>
9	<b>Univ Penn</b>	<b>9</b>	<b>1.4</b>	<b>10</b>	<b>84</b>
10	<b>Cardiff Univ</b>	<b>8</b>	<b>1.2</b>	<b>17</b>	<b>81</b>

Institution wise distribution of research output is sorted out in Table 7. **Mayo Clin** stands first with 14 records with a TGCS of 148, **Harvard Med Sch** stands with 13 records and TGCS 173 and the lowest record count is represented by **Cardiff Univ** with 8 records and TGCS 81.

**Table-8 Word wise of Hypothyroid Research**

SL NO	WORDS	RECS	PERCENT	TLCS	TGCS
1	<b>THYROID</b>	<b>228</b>	<b>34.4</b>	<b>93</b>	<b>816</b>
2	<b>HYPOTHYROIDISM</b>	<b>147</b>	<b>22.2</b>	<b>77</b>	<b>450</b>
3	<b>PATIENTS</b>	<b>109</b>	<b>16.4</b>	<b>29</b>	<b>362</b>
4	<b>MANAGEMENT</b>	<b>97</b>	<b>14.6</b>	<b>36</b>	<b>473</b>
5	<b>DISEASE</b>	<b>80</b>	<b>12.1</b>	<b>23</b>	<b>244</b>
6	<b>PREGNANCY</b>	<b>73</b>	<b>11</b>	<b>51</b>	<b>231</b>
7	<b>TREATMENT</b>	<b>58</b>	<b>8.7</b>	<b>12</b>	<b>200</b>
8	<b>SUBCLINICAL</b>	<b>56</b>	<b>8.4</b>	<b>35</b>	<b>202</b>
9	<b>WOMEN</b>	<b>50</b>	<b>7.5</b>	<b>23</b>	<b>132</b>
10	<b>REVIEW</b>	<b>44</b>	<b>6.6</b>	<b>10</b>	<b>180</b>

A visually designed word cloud will depict the commonly used words within the sampled articles, as shown in Figure eight. The terms, like Thyroid, Hypothyroidism, Patients, Mangement, Disease, Pregnancy, Treatment, Subclinical, Women, Review etc. are highlighted. This finding is probably going to point that, within the field of Hyothyroid, these terms are regularly cognized as vital keywords for study..

**Table-9 Languages wise of Hypothyroid Research**

S.NO	Language	Recs	Percent	TLCS	TGCS
1	<b>English</b>	<b>644</b>	<b>97.1</b>	<b>219</b>	<b>2424</b>
2	<b>Spanish</b>	<b>8</b>	<b>1.2</b>	<b>0</b>	<b>7</b>
3	<b>French</b>	<b>5</b>	<b>0.8</b>	<b>0</b>	<b>1</b>
4	<b>German</b>	<b>3</b>	<b>0.5</b>	<b>0</b>	<b>1</b>
5	<b>Portuguese</b>	<b>2</b>	<b>0.3</b>	<b>0</b>	<b>1</b>
6	<b>Russian</b>	<b>1</b>	<b>0.2</b>	<b>0</b>	<b>0</b>

The analysis revealed that a total of 6Languages contributed to the generation of the articles sampled. Figure 9 lists the top seven languages in which scholarly outputs are derived. Of the top seven languages, English and Spanish are the top two that reveal their publications on hypothyroidism as outstandingly high.

## **Conclusion**

The change in perspective in the area of Hypothyroidism over the period shows progressive growth in the investigation time frame, yet great response is witnessed in the year 2018, 2019 and 2020. The study highlights the contributions made by researchers during the period 2018-2020 reflected in the Web of Science database. Subject-wise analysis indicates that highest number of contributions was in the area of Medicine. Among 634 Articles, USA 156 tops the list with Articles. A comparison of USA output in regard to the global output could facilitate in understanding the contribution in a very higher angle. Though the records out there within the Web of Science database reveal a little variety, it's necessary thereto the web of Science covers solely the peer-reviewed journals.

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