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Bibliometric Analysis of Thyroid Research Publications in Asian Countries

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Abstract--- *The current scenario of thyroid malignancy has been increasing over the last four decades. Present study analysis is aiming to explore the factors causing the formation of various thyroid cancers and to spot out people with thyroid issues. The study aims to analyses the publications of thyroid malignancy in account of year, document type, author collaboration, journals, country, language, institution and word-wise characteristics mainly concentrating on Asian countries. The study found that the year wise output in the year 2015 witnessed 17.77% data which rapidly increased to 20.03% by the year 2019,it reveals that majority of articles are written by co-authorship. It reveals that China ranks at the top (5229/42.1%) with over majority the publications output of Thyroid Research Contribution followed by South Korea (1887/15.2%), Japan (1362/11%), Turkey (1231/909%), followed by India (721/5.8%), Iran, Taiwan, Israel, Pakistan and Saudi Arabia respectively.*

Keywords--- *Thyroid, Thyroid Diseases, Hyperthyroidism, Bibliometrics.*

I. INTRODUCTION

Thyroid hormone resistance continues to be a critical condition whose diagnosis and management is challenging when compared with autoimmune thyroid disease. Thyroid diseases are entirely different from other diseases in their ease of detection, treatment, and the visibility that even a tiny swelling of the thyroid offers to the treating physician. Early detection and treatment remains the cornerstone of controlling the disease.

Thyroid disorders include hyperthyroidism, hypothyroidism, thyroid inflammation (thyroiditis), thyroid enlargement (goiter), thyroid nodules, and thyroid cancer. Hyperthyroidism is characterized by excessive secretion of thyroid hormones: the most common cause is the autoimmune disorder Graves' disease. Hypothyroidism is characterized by a deficient secretion of thyroid hormones: the most common cause is iodine deficiency. In iodine-deficient regions, hypothyroidism secondary to iodine deficiency is the leading cause of preventable intellectual disability in children [3]. In iodine-sufficient regions, the most common cause of hypothyroidism is the autoimmune disorder Hashimoto's thyroiditis.

The primary function of the thyroid is the production of the iodine-containing thyroid hormones, triiodothyronine (T_3) and thyroxin (T_4) and the peptide hormone calcitonin. The thyroid hormones are created from iodine and tyrosine. T_3 is so named because it contains three atoms of iodine per molecule and T_4 contains four atoms of iodine per molecule. The thyroid hormones have a wide range of effects on the human body. These include:

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- **Metabolic.** The thyroid hormones increase the basal metabolic rate and have effects on almost all body tissues. Appetite, the absorption of substances, and gut motility are all influenced by thyroid hormones. They increase the absorption in the gut, generation, uptake by cells, and breakdown of glucose.
- **Cardiovascular.** The hormones increase the rate and strength of the heartbeat. They increase the rate of breathing, intake and consumption of oxygen, and increase the activity of mitochondria.
- **Developmental.** Thyroid hormones are important for normal development. They increase the growth rate of young people, and cells of the developing brain are a major target for the thyroid hormones T_3 and T_4.
- **Causes of thyroid problems**. Problems with the thyroid can be caused by: iodine deficiency. Autoimmune diseases, in which your immune system attacks your own body, leading either to hyperthyroidism (caused by Graves' disease) or hypothyroidism (caused by Hashimoto's disease).

II. METHODOLOGY

This study exhibits an exploratory analysis of thyroid research publications generated from previous studies through Web of Science Database, which has around 12000 high impact journals. The timeframe of the academic publications from the Web of Science database was set from the most recent five years, i.e. 2015-2019. A set of standards were generated to obtain a suitable sample which includes title and key words as "thyroid research". A total of 35,048 articles were obtained by following this process. Among the total articles 115 articles which showed unknown information were deleted. A sample size of 12296 was finally used for analysis.

Bibliometry is a means of objectively assessing the amount and spectrum of papers published in a particular book or journal. This helps in quantifying the contribution made by the publication, determining its impact, and assessing whether or not it is doing justice to its chosen subject. This analysis also helps in framing future editorial decisions and policies, and provides a reader-friendly assessment of the publication. Bibliometry also serves as a bench marking tool, with which other publications, or future issues or editions of the same publication, can be compared. In general, bibliometry serves as a scientific tool to help further the cause of science.

III. SCOPE & LIMITATION OF STUDY

Present Study is limited to search results in the title of "Thyroid Research Publications" in Web of Science database during 2015 to 2019. The data was analyzed with the help of Microsoft office excel.

1. Objectives

This Segment interprets the results of this study in terms of the following attributes:

- A bibliometric analysis on thyroid research publication related to Asian countries from 2015 to 2019 depicting the annual trends.
- Document forms retrieved in thyroid research publications.
- Scholarly output of co-authorship in thyroid research publications in Asian Countries.
- Productive output of thyroid research publications from top ten authors, countries/Institutions and journals in Asian Countries.

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- Most influential language and keywords timeline view of thyroid research Publications confined to Asian Countries.

Table 1: Year Wise Output in Thyroid Research

Sl.NO	*Publication Year*	*Recs*	*Percent*	*TLCS*	*TGCS*
1	2015	2185	17.77	3937	16357
2	2016	2440	19.84	3604	14600
3	2017	2528	20.56	2610	10387
4	2018	2680	21.80	1415	5905
5	2019	2463	20.03	254	1156
	Total	**12296**	**100.00**	-	-

Note: TLCS: Total Local Citation Score, TGLS: Total Global Citation Score

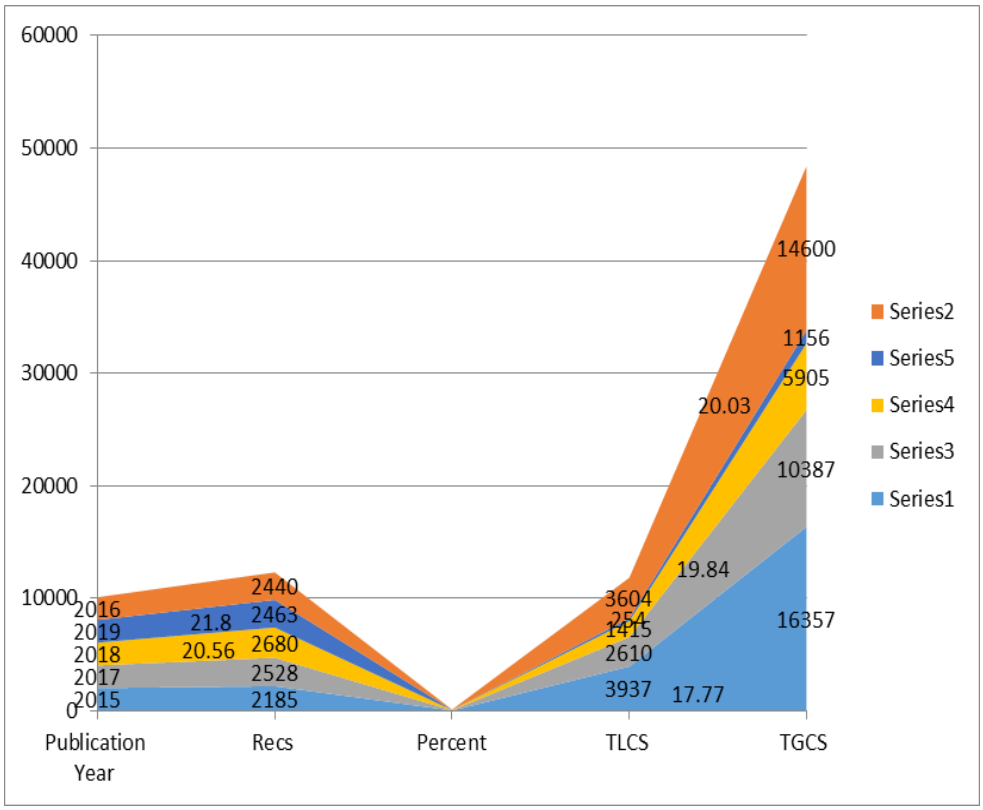

Figure 1: Year Wise Output in Thyroid Research

Figure 1 plots the annual trends of thyroid publications related to Asian Countries. More scholars started to research in this field, which marked a hike in the number of publications. The year 2015 witnessed 17.77% data which rapidly increased to 20.03% by the year 2019. There are many reasons for the rapid growth. Firstly, with the rapid development of Science and technology, people were more likely to obtain massive data and information on the disease and the measures to diagnose earlier. The study of thyroid research has attracted people from all walks of life. More and more countries began to devote themselves to the researches and applications for making the diseased to a low rate.

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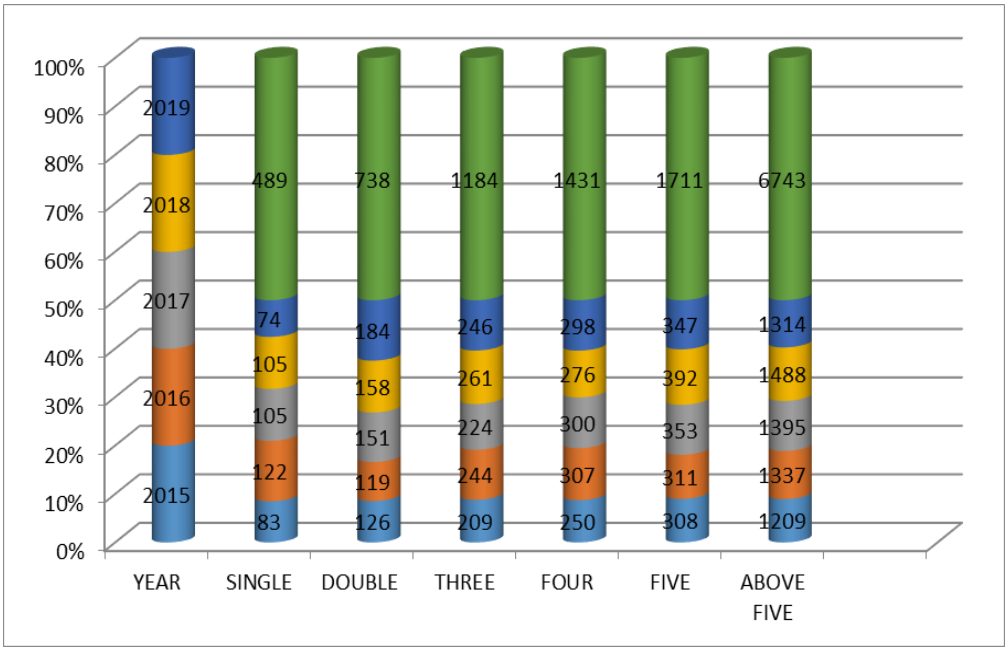
Table 2: Document Wise Output in Thyroid Research

Sl. NO	*Document Type*	*Recs*	*Percent*	*TLCS*	*TGCS*
1	Article	9653	77.8	10628	42549
2	Meeting Abstract	1040	8.4	5	73
3	Review	732	5.9	917	4752
4	Editorial Material	310	2.5	71	310
5	Letter	304	2.4	98	319
6	Correction	132	1.1	5	59
7	Article; Early Access	102	0.8	0	8
8	Article; Proceedings Paper	60	0.5	71	245
9	News Item	34	0.3	3	11
10	Retraction	12	0.1	2	5
	Total	12296	100.00	-	-

Ten document types were found in these 12296 publications. The most frequent document type is article (9653), accounting for 77.8% of total publications. At the second position is Meeting abstract (1040), with a proportion of 8.4%. Other document types including Review (732), Editorial Material (310), Letter (304), Correction (132), Article early access (102), proceeding paper (60), news item (34) and Retraction (12). Table 2 lists the numbers and proportions of various document types. All documents were downloaded on 10th December 2019.

Table 3: Collaborative Authors in Thyroid Research Output

Sl.NO	*YEAR*	*SINGLE*	*DOUBLE*	*THREE*	*FOUR*	*FIVE*	*ABOVEFIVE*	*TOTAL*
1	2015	83	126	209	250	308	1209	2185
2	2016	122	119	244	307	311	1337	2440
3	2017	105	151	224	300	353	1395	2528
4	2018	105	158	261	276	392	1488	2680
5	2019	74	184	246	298	347	1314	2463
TOTAL		**489**	**738**	**1184**	**1431**	**1711**	**6743**	**12296**



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 12296 thyroid research

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publications between 2015 and 2019 (until December 10, 2019), with an average of 300 articles published each year. It can be seen that from 2015 to 2019, the average number of authors per paper is significantly exceeding year by year. Through further examination, the samples found that majority of articles are written using co-authorship.

TLCS/t - Total Local Citation Score per year

TGCS/t - Total Global Citation Score per year

TLCR - Total Local Cited References

Table 4: Top 10 Authors in Thyroid Research

Sl.NO	*Author*	*Recs*	*Percent*	*TLCS*	*TLCS/t*	*TLCSx*	*TGCS*	*TGCS/t*	*TLCR*
1	Wang Y	218	1.8	225	65	178	738	229.55	274
2	Lee JH	173	1.4	778	215.05	314	1551	442.9	473
3	Kim JH	164	1.3	599	168.15	325	1355	389.7667	261
4	Zhang Y	158	1.3	141	40.48333	116	675	211.6167	216
5	Zhang L	141	1.1	199	57.61667	144	659	198.8333	184
6	Liu Y	129	1	102	36.53333	91	419	142.35	131
7	Baek JH	126	1	759	211.2167	320	1410	401.0167	540
8	Lee J	120	1	105	32.21667	75	475	150.6833	126
9	Li J	117	0.9	90	25.98333	68	446	132.4	158
10	Miyauchi A	108	0.9	306	102.0833	190	751	240.65	196

In this section, authors of the most cited articles or books by thyroid research publications are studied and presented in Table 4. Wang Y represents 2018 records with TGCS 738 (1.8%) and Lee J H with same 173 (1.4%) records but TGCS 1551. Miyauchi A has contributed 108 (0.9%) records with TGCS 751.

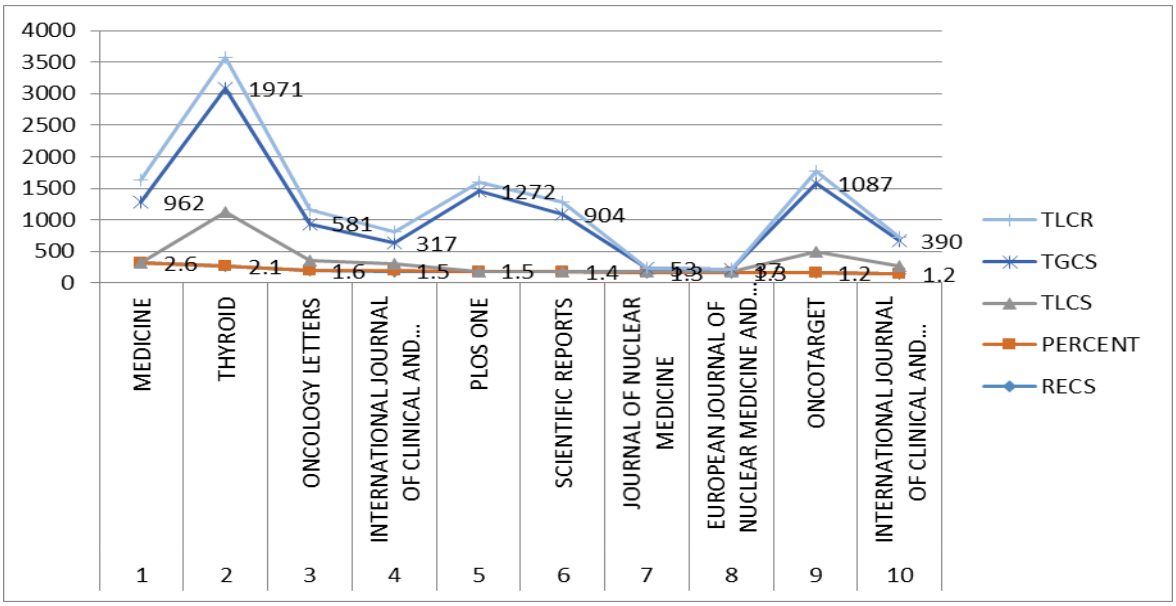

Figure 2: Top 10 Journals in Thyroid Research

Figure 2 the distribution of core journals on Thyroid research study. The figure shows, Medicine has the highest record of 2.6%, TGCS value (962) followed by Thyroid (2.1%) and TGCS 1971, Oncology Letters potrays 1.6% with TGCS (581) and International Journal of Clinical and Experimental Pathology (1.2 %) with TGCS 390 respectively.

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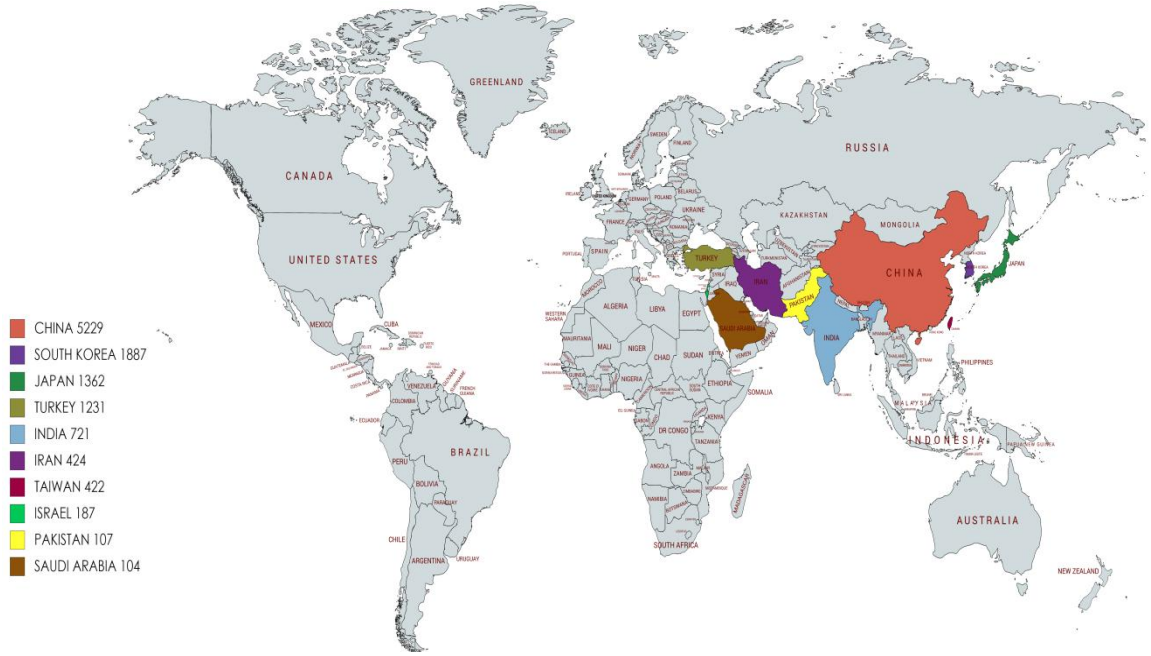
Table 5: Top 10 Country Wise of Thyroid Research

S.NO	*COUNTRY*	*RECS*	*PERCENT*	*TLCS*	*TGCS*
1	Peoples R China	5229	42.1	5344	22259
2	South Korea	1887	15.2	3406	10386
3	Japan	1362	11	1230	5372
4	Turkey	1231	9.9	660	2828
5	India	721	5.8	326	2240
6	Iran	424	3.4	287	1584
7	Taiwan	422	3.4	378	1859
8	Israel	187	1.5	124	776
9	Pakistan	107	0.9	36	389
10	Saudi Arabia	104	0.8	103	413



In terms of countries, Table 5 reveals that China ranks at the top (5229/42.1%) with over majority the publications output of Thyroid Research Contribution. South Korea (1887/15.2%), Japan (1362/11%), Turkey (1231/909%), followed by India (721/5.8%), Iran, Taiwan, Israel, Pakisthan and Saudi Arabia respectively.

Table 6: Top 10 Institutions contributed in Thyroid Research

S.NO	*INSTITUTION*	*RECS*	*PERCENT*	*TLCS*	*TGCS*
1	Shanghai Jiao Tong Univ	377	3	528	1711
2	Yonsei Univ	286	2.3	639	1832
3	Fudan Univ	285	2.3	393	1295
4	China Med Univ	280	2.3	360	1550
5	Seoul Natl Univ	278	2.2	684	2026
6	Univ Ulsan	271	2.2	1115	2225
7	Sungkyunkwan Univ	249	2	771	1878
8	Sichuan Univ	207	1.7	215	662
9	Zhejiang Univ	203	1.6	218	869
10	Shandong Univ	192	1.5	234	855

Institution wise distribution of research output is sorted out in Table 6. Shanghai Jiao Tong University stands

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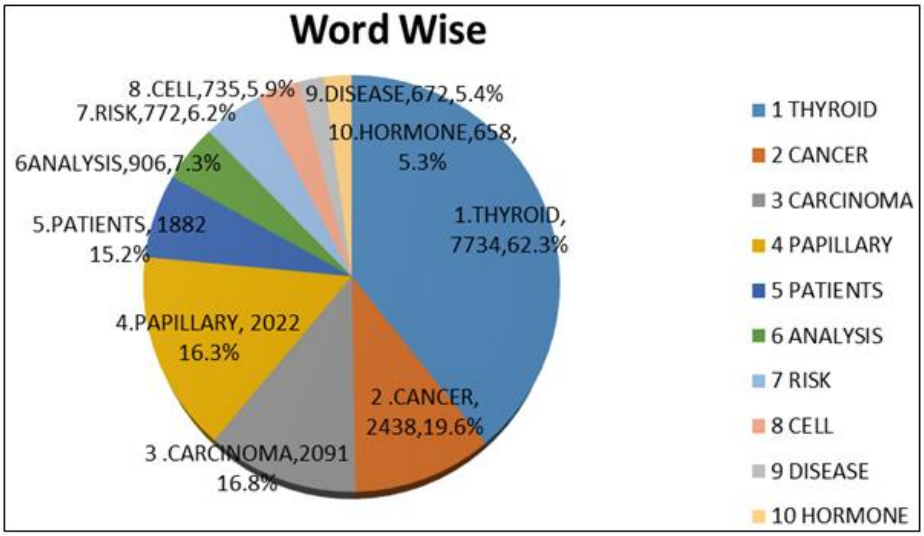
first with 377 records with a TLCS of 528, Yonsei University stands with 286 records and TLCS 639 and the lowest record count is represented by Shandong University 192 records with TLCS 234.

Table 7: Word Wise of Thyroid Research

S.NO	*WORD*	*RECS*	*PERCENT*	*TLCS*	*TGCS*
1	THYROID	7734	62.3	9515	28437
2	CANCER	2438	19.6	2539	10684
3	CARCINOMA	2091	16.8	2763	7822
4	PAPILLARY	2022	16.3	3730	9097
5	PATIENTS	1882	15.2	1596	5791
6	ANALYSIS	906	7.3	1104	4188
7	RISK	772	6.2	1141	3643
8	CELL	735	5.9	824	3717
9	DISEASE	672	5.4	498	2116
10	HORMONE	658	5.3	539	2368



The terms, like Thyroid, Cancer, Carcinoma, Papillary, Patients, Analysis, Risk, Cell, Disease, Hormone, etc. are highlighted. This finding is probably going to point that, within the field of thyroid research publications, these terms are regularly cognized as vital keywords for study. Therefore, the results of the word frequency analysis are in line with the content analysis to a prominent extent.

Table 8: Languages Wise Distribution of Thyroid Research

S.NO	*Language*	*Recs*	*Percent*	*TLCS*	*TGCS*
1	English	12373	99.7	11818	48384
2	German	17	0.1	0	2
3	Chinese	7	0.1	0	2
4	Turkish	4	0	0	5
5	Portuguese	3	0	1	9
6	Italian	2	0	0	7
7	Spanish	2	0	0	0
8	Dutch	1	0	0	0
9	Greek	1	0	1	4
10	Japanese	1	0	0	0

The analysis revealed that a total of 8 Languages contributed to the generation of the articles sampled. Figure 8

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lists the top ten languages in which scholarly outputs are derived. Of the top ten languages, English and German are the top two that reveal their publications on thyroid research publications outstandingly high.

IV. CONCLUSION AND SUGGESTIONS

- In Web of Science, under the category Thyroid Research, 35,048 Articles were retrieved and 12296 articles were filtered for the study purpose, among which maximum number of Articles contributed was in the year 2019 and minimum in 2015.
- Subject-wise analysis indicates that highest number of contributions was in the area of Medicine.
- Among 12296 Articles, China tops the list with 5229 Articles & India's contribution to "Thyroid Research" is 721 Articles during 2015–2019, which is ranked fifth.
- The results have provided a comprehensive understanding of thyroid research publications, in particular, in view of the scope, co-production, and performance of this research stream.
- The study concludes that the number of thyroid research articles has increased annually in recent years and the scope of thyroid research studies is exploring in terms of coverage of research domains and countries so that measurement is no more feasible due to its healthy growth.
- The data for this study was downloaded from Web of Science databases and more than 90% of the articles were found to be contributed in English language.
- To conclude, a Thyroid Research publication not only indicates the current trends of development, but also points about the opportunities and challenge. In future studies, more databases or resources should be included in order to generate a larger sample for analysis. The research results of this study helped to understand the field of thyroid research from a macro perspective. In future, we intend to use data mining methods to analyze the texts of all publications to identify the current research hotspots and development trends in this field.

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