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A Bibliometric Analysis of Publications on Thyroid Carcinoma

***R.Abhilash Babu, **Dr L. N.Uma Devi**

***** Research scholar, Department of Library and information Science, Annamalai University, Annamalai Nagar- 608 002, Tamilnadu, India. Mail ID: abhilashbabu20000@gmail.com

****** Assistant Professor, Department of Library and Information Science, Annamalai University, Annamalai Nagar- 608 002, Tamilnadu, India

Abstract

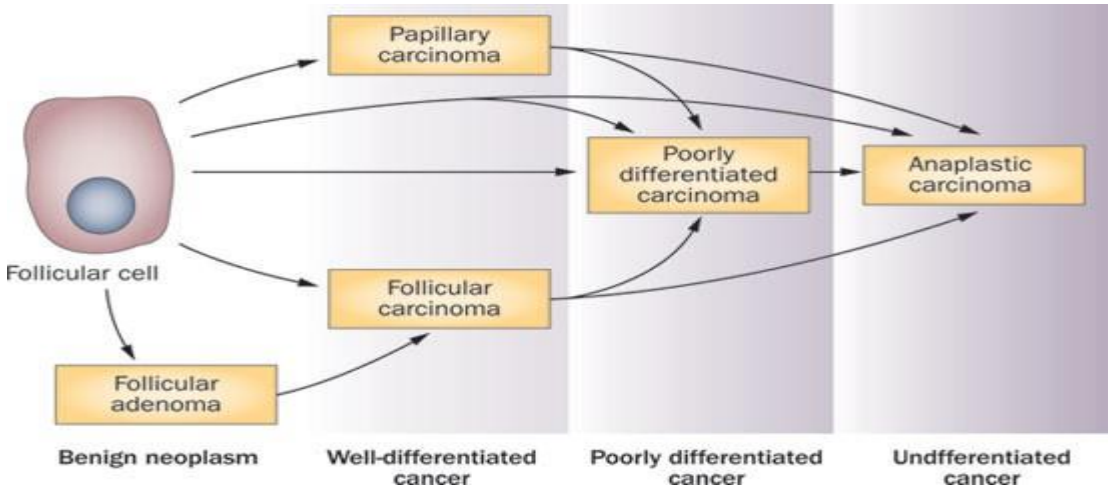
Thyroid cancer is the most common endocrine malignancy. This paper attempts to statistically analyze Thyroid Cancer in terms of publication out-turn as provided by the resource Web of Science. This study focuses on year wise distribution, document type, author's research productivity, research areas, countries of contributing authors, together with journal wise and language wise assessment. The study unveils that multi authors have accorded 2417 articles during 2016 to 2020.

Keywords: Thyroid, Bibliometric Research, Thyroid cancer publications

Introduction

The critical role of tumor microenvironment is part of debate in tumor initiation and progression**.** Genetic variations or altered Immune system has cogently effect on progression and development of thyroid cancer. Thyroid cancer begins in the follicular cell of the thyroid gland. There are 2 types of cells located within the thyroid parenchyma: the follicular cells and the supporting cells (also called the C cells). Cancers derived from follicular cells are generally differentiated thyroid carcinomas (DTC). Although these cancers are not usually aggressive, they can eventually mutate into more aggressive variants.

Thyroid cancer progresses according to a well-defined tumor progression model (Figure 1). Approximately 85% of patients present with DTC, and they have an excellent prognosis following treatment. Between 10% and 15% of tumors will mutate into more aggressive variants of thyroid carcinoma .These tumors may present with tall-cell features or as tall-cell thyroid carcinoma and they have a biologic behavior that requires more aggressive surgical intervention and adjuvant therapy. Notably, these patients could be candidates for novel therapies if their disease is refractory to radioactive iodine (RAI).



Thyroid cancer is most frequently encountered in younger age groups.8 Across the literature, age at onset appears as a bell-shaped curve, with the highest incidence in the second, third, and fourth decades of life. Within the past 2 decades, however, there has been a rise in the incidence of thyroid cancer during the fourth and fifth decades of life.9 The increased diagnoses may be attributable to incidental findings of tumors on imaging studies, such as ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET), performed for other reasons.

Typically, thyroid cancer is diagnosed after intra thyroid nodules are discovered on routine imaging. The majority of such patients with thyroid cancer have no symptoms at the time of initial diagnosis. When symptoms do arise, they are usually caused by invasion of an adjacent structure by the primary tumor or metastatic progression to a lateral neck lymph node. A minority of patients present with locally advanced thyroid cancer (often poorly differentiated or anaplastic carcinoma). These patients may present with either symptoms of a mass in the neck, a feeling of pressure in the neck, or a choking sensation. Occasionally, patients present with hoarseness caused by paralysis of the vocal cords resulting from invasion of the recurrent laryngeal nerve. Some patients may also experience hemoptysis or airway obstruction from tumors growing into the trachea and compromising the airway. In some patients, the only symptom is a lump in the neck that turns out to be a metastatic lymph node.

A series of tests can be performed to diagnose and assess the primary tumor. The tests most relevant to decision-making in this disease are an ultrasound of the thyroid gland and a fine-needle aspiration biopsy. All other tests are relatively peripheral and subsequent to the establishment of the diagnosis of cancer.

Fortunately, the majority of newly diagnosed thyroid cancers are well-differentiated papillary carcinomas that are easily treatable and highly curable, and they respond well to therapy. In the past 2 decades, more than 80% of patients with newly diagnosed thyroid cancer had tumors less than 2 cm in diameter. This relatively small size implies that the cancer is at an early stage and associated with an excellent prognosis.

There are two types of patients within the intermediate-risk cluster class. One kind consists of younger patients with tumors that have poor microscopic anatomy or a gross extra thyroid extension. The second class includes older patients with little intra thyroidal differentiated tumors. Management need to be provided to the patient to avoid over treating the patient.

Symptoms of Thyroid Cancer

Lump in the Neck

Swollen Lymph Node

Hoarse Voice

Difficulty Swallowing or Breathing

Neck Pain

Throat Pain

The symptoms of thyroid cancer are difficult to detect—and typically the noticeable symptoms are caused not by the cancer itself rather by the thyroid nodule wherever the thyroid cancer is developing.

Objectives

- To examine the growth of research output on Thyroid Carcinoma during 2016-2020.
- To identify the areas with country wise distribution of publications.
- To review the country wise Global Citation Scores, Local Citation Score.
- To ascertain the Document type wise distribution in Thyroid Carcinoma
- To find out the collaborative authors and Author wise Contribution in Thyroid Carcinoma Output.
- To persue the top journals in Thyroid Carcinoma.
- To portray the Output of Thyroid Carcinoma Institution wise, Word Wise and Language Wise
- To determine the Word wise output in Thyroid Research.
- To identify the Language wise Contribution in Thyroid Research.

Methodology

Documents used in this study were based on the online database Web of Science and the methodology administered is bibliometric analysis of articles published from 2016 to 2020 (5years). The keyword "**thyroid carcinoma**" has been used as the search term in the field of topic and the time period 'All Years'. This study aimed to bring out the prevalence of research output in thyroid cancer during the twenties.

Data Collection

A total of 2417 records on thyroid cancer were retrieved for the study from 2016-2020. The articles published were analysed for the type of the articles (editorial, review article, original article, case report, letter to the editor, abstracts, and others). These data were organized, calculated, tabulated, analyzed and presented by using simple arithmetic and statistical methods to arrive at the desired results. The data were downloaded and exported to excel file to tabulate them (Data as per on 28th August, 2020).

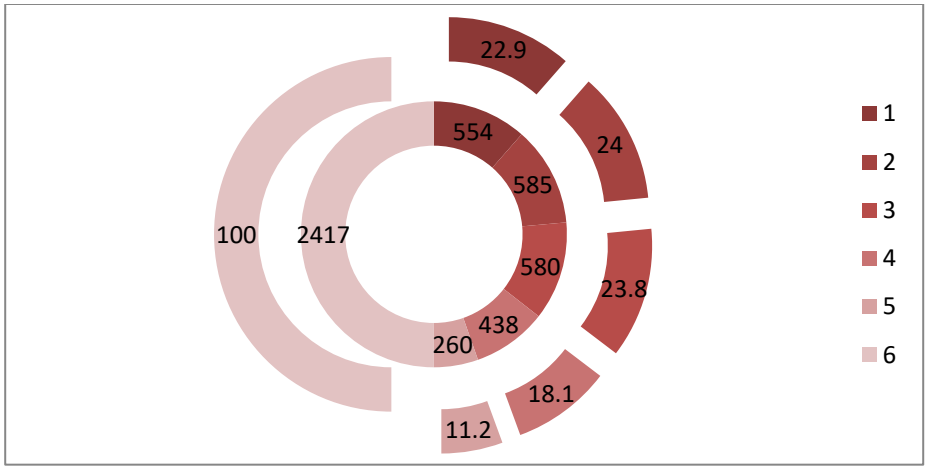
Limitations

The study is strictly confined to thyroid carcinoma and is not centered to any specific thyroid disorders. The year of study limits from 2016 to 2020. One of the limitations of the study is that the scope is confined to cover only the publications cited in Web of Science (ugc).

Analysis and Interpretation

Table-1 Year wise publication in Thyroid Carcinoma Research

S.NO	Publication Year	Recs	Percent
1	2016	554	22.9
2	2017	585	24
3	2018	580	23.8
4	2019	438	18.1
5	2020	260	11.2
	Total	**2417**	100.00



During the span of 2016-2020 scientists all over the world have produced a total of 2417 publications on thyroid cancer. Among the 2417 records 64 were found to be unknown category. Table-1 shows the year wise distribution of papers published. There were only 554 records in 2016 and then it increased steadily and again came down to 260 in 2020. The emerging broad spectrum of thyroid cancer is a trigger for more research and publications in this particular field.

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

Table-2 Document wise output in Thyroid Carcinoma Research

S.NO	Document Type	Recs	Percent	TLCS	TGCS
1	Article	1574	64.6	3069	18046
2	Review	334	14.3	439	4476
3	Meeting Abstract	264	11	4	37
4	Editorial Material	85	3.4	96	750
5	Article; Proceedings Paper	58	2.3	55	376
6	Article; Early Access	48	1.9	0	27
7	Letter	32	1.3	30	94
8	Review; Early Access	10	0.4	0	5
9	Review; Book Chapter	7	0.3	6	74
10	Editorial Material; Early Access	5	0.2	0	0
	Total	**2417**	100.00	-	-

Table 2 portrays 10 document types researched for this study yielding a total of 2417 records during the course of study. The productivity of thyroid cancer research is spread over a variety of publication media like Journal Articles, Review, Proceedings papers, Meeting abstracts, Editorial materials, Book review, etc. The most scholarly

communication of scientific research is published in Journals 1572, 64.6%, TLCS is 3069 and TGCS is 18046), followed by review and other forms.**Table-3 Collaborative Authors in Thyroid Carcinoma Research**

SL.NO	YEAR	SINGLE	DOUBLE	THREE	FOUR	FIVE	ABOVE FIVE	TOTAL
1	2016	21	54	50	52	49	328	554
2	2017	18	54	62	78	72	301	585
3	2018	23	60	54	64	54	325	580
4	2019	18	45	46	48	48	233	438
5	2020	13	19	26	32	36	134	260
TOTAL		93	232	238	274	259	1321	**2417**

Table-3 illustrates the authorship pattern of contribution. It is noticed that the year 2017 marks highest contribution of 23 out of 93 records by single authors; 60 out of 232 records by double author in the year 2018 ; 62 out of 238 records by three authors in the year 2017 ; 78 out of 274 records by four authors in the year 2017 and 72 out of 259 records by five authors in the year 2017. It is found that out of 2417 articles, above five authored articles are the highest with 585. The single author contribution is low when related to multi authored papers. A prominent note of the study is that the majority of the articles are contributed by joint authors.

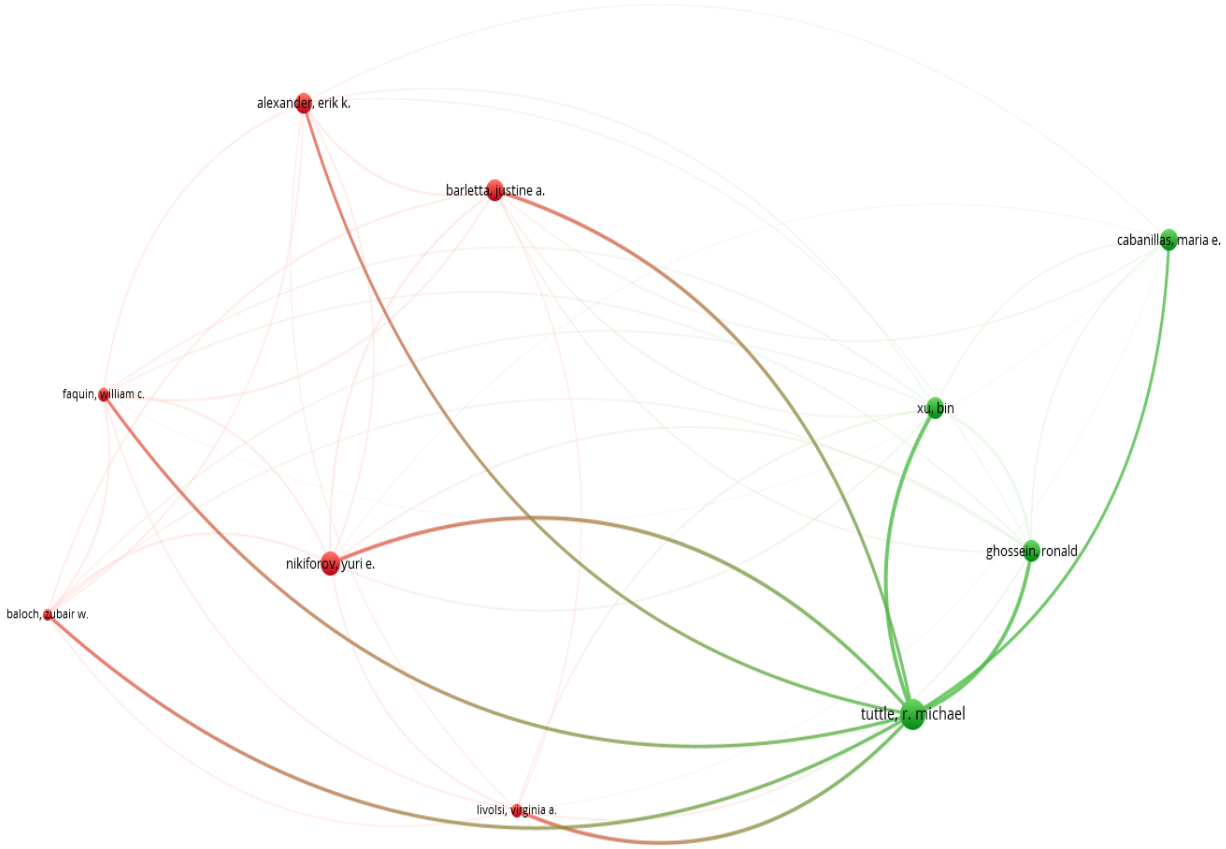
TLCS/t - Total Local Citation Score per year

TGCS/t - Total Global Citation Score per year

TLCR - Total Local Cited Reference

Table-4 Top Ten Authors in Thyroid Carcinoma Research

SL. NO	Author	Recs	Percent	TLCS	TLCS/t	TLCSx	TGCS	TGCS/t	TLCR
1	Tuttle RM	66	2.7	294	71.25	220	1114	273.5833	103
2	Nikiforov YE	43	1.7	544	127.5833	396	1381	333.8833	122
3	Shaha AR	43	1.7	64	14.73333	40	331	86.76667	77
4	Lloyd RV	42	1.7	331	73.13333	211	1007	230.3167	81
5	Cabanillas ME	41	1.7	190	51.01667	134	732	198.7333	119
6	Ganly I	41	1.7	233	53.65	177	732	169.9667	65
7	Barletta JA	40	1.6	393	87.68333	271	995	233.4833	179
8	Ghossein R	37	1.5	220	50.91667	168	644	149.5348	60
9	Xu B	37	1.5	223	50.6	181	613	137.8848	80
10	Alexander EK	35	1.4	179	42.66667	146	443	110.7333	111



From 2016 to 2020, 2417 papers were published and Table-4 details the top 10 authors in thyroid cancer research. This table highlights Tuttle R M as the topper with 66 records. He obtained 294 TLCS, 1114 TGCS and 103 TLCR. The second, third and fourth places are occupied by Nikiforov Y E, Shaha A R and Lloyd R V.

SL.NO	JOURNAL	RECS	PERCENT	TLCS	TLCS/t	TGCS	TGCS/t	TLCR
1	THYROID	175	7.1	609	152.7833	2396	621.2741	373
2	MODERN PATHOLOGY	116	4.7	146	38.46667	504	180.3682	39
3	LABORATORY INVESTIGATION	103	4.2	6	1.666667	49	14.33333	9
4	ENDOCRINE PATHOLOGY	59	2.4	129	33.45	526	139.6	227
5	CANCER CYTOPATHOLOGY	58	2.3	327	77.66667	754	189.1015	275

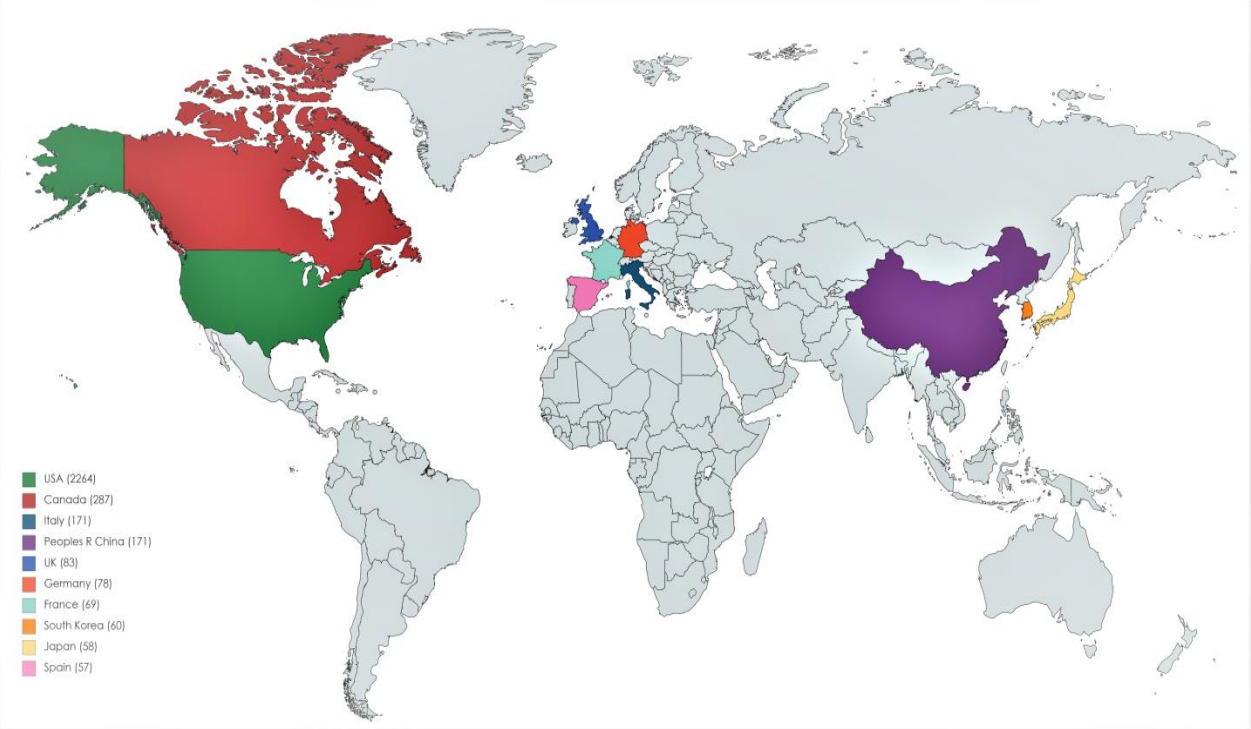
6	HEAD AND NECK JOURNAL FOR THE SCIENCES AND SPECIALTIES OF THE HEAD AND NECK	56	2.3	52	13.75	297	80.6	80
7	JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM	56	2.3	218	53.1	886	225.6833	82
8	DIAGNOSTIC CYTOPATHOLOGY	55	2.2	63	17.81667	225	61.21667	152
9	ENDOCRINE-RELATED CANCER	46	1.9	113	28.01667	663	170.5667	107
10	SURGERY	45	1.8	85	22.08333	444	121.6333	48

Table-5 Top Ten Journals in Thyroid Carcinoma Research

The literature of thyroid cancer research (2015 to 25th August.2020) retrieved from Web of Science scattered over 10 top journals is sketched in table 5. The journal THYROID occupies the top position with 175 (7.1 %, TLCS 609, TLCS/t 152.7833, TGCS 2393, TGCS/t 621.2741 and TLCR 373) records followed by Modern Pathology and Laboratory Investigation that came second and third respectively. Surgery with 45 records ranks last among the 10 journals.

Table-6 Top Ten Country wise of Thyroid Carcinoma Research

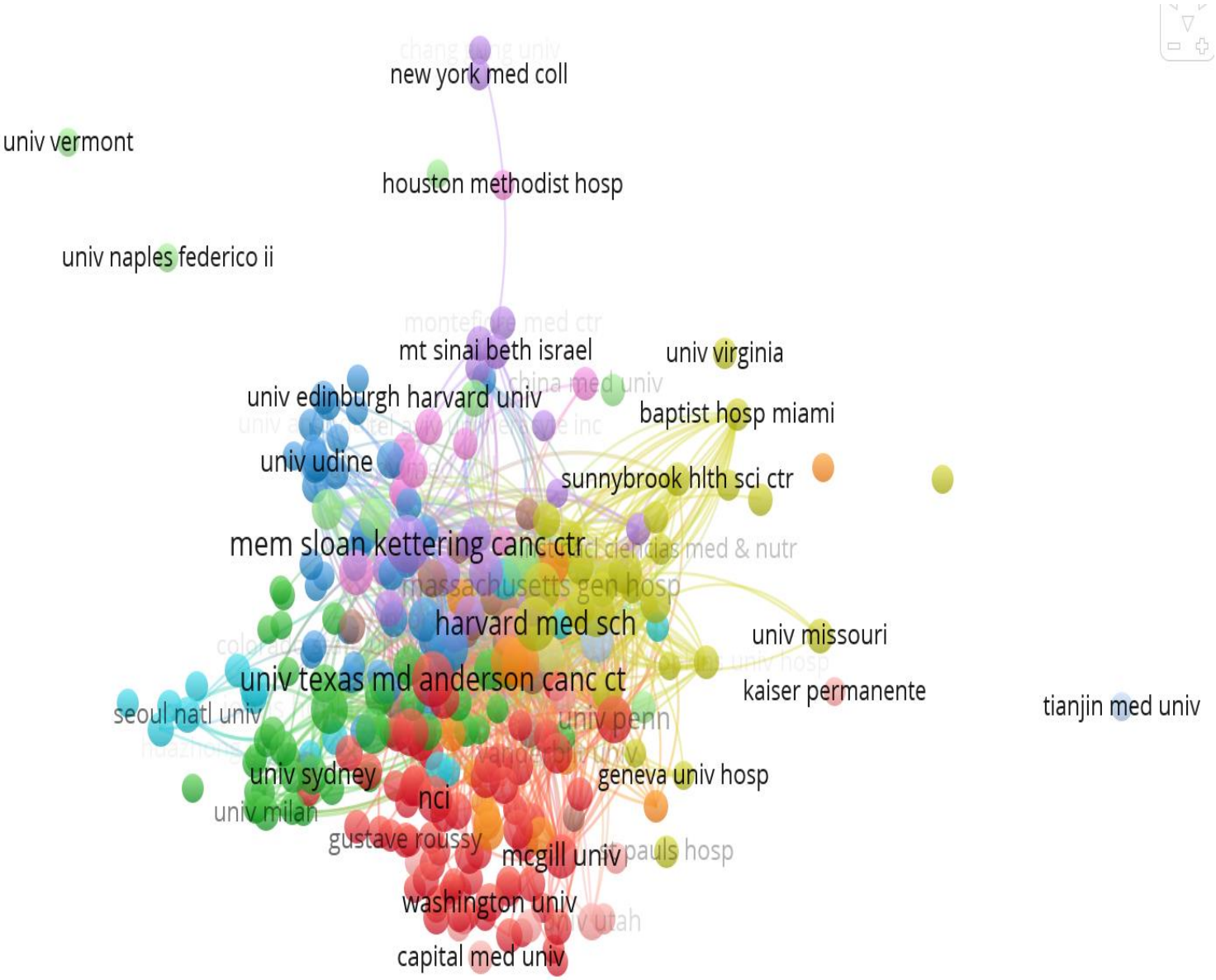
SL.NO	COUNTRY	RECS	PERCENT	TLCS	TGCS
1	USA	2264	91.3	3515	22571
2	Canada	287	11.6	715	4644
3	Italy	171	6.9	724	4010
4	Peoples R China	171	6.9	101	2126
5	UK	83	3.3	336	2633
6	Germany	78	3.1	119	1114
7	France	69	2.8	384	1806
8	South Korea	60	2.4	123	955
9	Japan	58	2.3	303	1559
10	Spain	57	2.3	74	626



Researchers in bibliometric studies are interested to find the countries which are contributing the best in any given field and Table-6 displays the top 10 countries in thyroid cancer research publications. USA dominates with 2264 records and Canada with 287 records in second position followed by Italy, China, UK , and so.

Table-7 Top ten Institutions wise of Thyroid Carcinoma Research

SL.NO	INSTITUTION	RECS	PERCENT	TLCS	TGCS
1	Mem Sloan Kettering Canc Ctr	215	8.7	850	3438
2	Univ Texas MD Anderson Canc Ctr	176	7.1	587	2903
3	Harvard Med Sch	154	6.2	717	2708
4	Mayo Clin	93	3.7	171	942
5	Univ Pittsburgh	93	3.7	635	2066
6	Univ Toronto	92	3.7	226	2334
7	Massachusetts Gen Hosp	85	3.4	587	1766
8	Johns Hopkins Univ	80	3.2	215	1453
9	Brigham & Womens Hosp	79	3.2	377	1553
10	Univ Wisconsin	74	3	379	1287



Distribution of top 10 Institution wise of thyroid research is displayed in table 7. The research articles emerged from various research institutes, universities and affiliated colleges. The Mem Sloan Kettering Canc Ctr tops with 215 articles (8.7%, TLCS 850, and TGCS3438), followed by Univ Texas MD Anderson Canc Ctr with 176 articles (7.1%, TLCS 587 and TGCS 2903) in the second position and Univ Wisconsin ranked last with 74 records (3%, TLCS 379 and TGCS 1287) among the top 10 institution list. HistCite is designed to analyze and visualize literature searches made on Web of Science Core Collection

Table-8 Word wise of Thyroid Carcinoma Research

SL.NO	WORDS	RECS	PERCENT	TLCS	TGCS

1	THYROID	1803	72.7	3319	14608
2	CANCER	818	33	1150	9095
3	CARCINOMA	781	31.5	1358	5233
4	PAPILLARY	600	24.2	1635	5427
5	PATIENTS	266	10.7	346	2526
6	FOLLICULAR	248	10	1180	2929
7	DIFFERENTIATED	236	9.5	529	2385
8	RISK	201	8.1	377	2018
9	CELL	186	7.5	183	1481
10	FEATURES	183	7.4	684	1715

Table – 8 provides a snapshot of the top 10 words of thyroid carcinoma research. The increasing cases in thyroid cancers promote different areas of research exploration. The table grades Thyroid as the major word in research with 1803 articles (72.7%, TLCS 3319 and TGCS 14608) , Cancer in the second place with 818 records (33%, TLCS- 1150 and TGCS- 9095) and Features as the least word in research with 183 articles (7.4%, TLCS- 684 and TGCS- 1715) in the top 10 list.

Table-9 Languages wise of Thyroid Carcinoma Research

S.NO	Language	Recs	Percent	TLCS	TGCS
1	English	2414	99.9	3704	23901
2	Spanish	2	0.1	0	3
3	German	1	0	2	2

It is also important to identify the languages of publication as exhibited in (Table 9). English is the predominant language of publications. Out of the 2417 records retrieved, English occupies the first position with 2414 (99.9 %, 3704 TLCS and 23901 TGCS) records. Relatively the number of publications in non-English is less, due to the journal selection and coverage policy of the Web of Science database.

Conclusion

In conclusion molecular and cellular analysis of the tumor progression through the genetic and immunological study of different immune cells will result considerable implication in the discovery of diagnostic and prognostic markers and novel targets in this common endocrine malignancy. However, growing reports points a steady increase within the development of thyroid cancer. The growing evidence suggesting that changes in obesity and smoking prevalence have contributed to increasing thyroid cancer rates. This study has several important limitations and is mainly confined to thyroid cancer publications. The data collected from 2016- 2020 identifies that there is utmost need of more research on this area to monitor the steady increase of the thyroid cancer cases all over the world. It will be important to continue monitoring thyroid cancer incidence and mortality rates over time to see if the observed trends persist.

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