

Publication Trends of Research Articles in the Field of Osteosarcoma

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Abstract

Background/Objectives: The present study examines the publication trends in the field of Osteosarcoma research during 2008 to 2017. **Methods/Statistical Analysis:** The data have been collected from Web of Science database. The search strings were used 'osteosarcoma' in the Title search box, fields were used, and the time span field was selected from 2008 to 2017. Totally 6490 records were retrieved; the data downloaded and analyzed using MS office-Excel. **Findings:** This study identifies the year wise research output in Osteosarcoma and finds out document types, sources types, language wise publications; in this research, top fifteen sources published in Osteosarcoma research and top fifteen countries contributed. The year wise analysis shows that the data was increasing from 5.56% to 16.21%, Totally 19609 authors were contributed in Osteosarcoma research publications, among the 19609 authors, Gorlick R and Wang Y have occupied first and second place with 90 papers contributed, Zhang Y had third place with 80 papers, Picci P had fourth place with 76 contributions, remaining authors were contributed less than 75 research papers in this area; majority of the studies are collaborative contributions. Among the 97 countries contributed in this research, top fifteen countries are tabulated. China has first place with 2308 contributions, USA has seconds place with 1549 records, Japan has third place with 483 records. Among the top institutions, universities contributed more compared to other institutions. **Novelty/Improvement:** This research showcased the trend in Osteosarcoma research; Statistical methods were used in this study in order to analyze the evolution, and the historical development of the Osteosarcoma subject, involving some relevant aspect such as the patterns of authorship, year wise publication and growth of publications.

Keywords: Bone Cancers, Chondrosarcoma, Monoclonal Disease, Osteosarcoma, Polyclonal Disease

1. Introduction

Osteosarcoma is the most common bone cancer among those with non-hematological origin and affects mainly pediatric patients¹ children and adolescents, comprising 56% of all bone cancers in individuals younger than 20 years². Bone cancers encompass different types of tumors, such as Ewing sarcoma and chondrosarcoma, but the most frequent among them is the osteogenic sarcoma, also known as osteosarcoma (OS), which comprises a 20-40% of total new, diagnosed bone cancers^{3,4}. Indeed, osteosarcoma initiates as a monoclonal disease,

which quickly develops into a polyclonal disease and is considered one of the most complex cancers in terms of molecular aberration⁵. Osteosarcoma research is growing rapidly as evidenced by the increasing research publication output. Bibliometrics is the use of quantitative analysis and statistics to describe patterns of publication within a given field or body of literature⁶. There are several bibliometric studies have reported analysis of cancer literature, but fewer only available on osteosarcoma research so far. So, the present study attempts to fill this gap by presenting research publications on osteosarcoma.

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2. Materials and Methods

The relevant data have been collected from the Web of Science database covering the period from 2008 to 2017. The search string 'Osteosarcoma' in the Title search box, field were used, and the time span field select was from 2008 to 2017. Totally of 6490 records were retrieved; the data downloaded and analyzed using MS office -Excel as per objectives of the present study.

2.1 Relative Growth Rate (RGT) and Doubling Time (DT)

The Relative Growth Rate is the number of publications/pages per unit of time. Hence, one year is taken as the unit of time. The mean relative growth rate R (1-2) over a specified period of interval can be calculated from the following equation suggested by⁷

$$R(1-2) = \frac{W2 - W1}{T2 - T1}$$

Where,

- R = Mean relative growth rate over the specify period of interval
 $W1$ = $\log W1$ (Natural log of initial number of publications/pages)
 $W2$ = $\log W2$ (Natural log of initial number of publications/pages)
 $T2-T1$ = Unit difference between the initial time and final time.

Therefore,

- $R(a)$ = relative growth rate per unit per of publication per unit of time (year)
 $R(p)$ = relative growth rate per unit per of pages per unit of time (year)

The corresponding Doubling time for publications and pages can be calculated by using the following formula:

$$\text{Doubling time (Dt)} = \frac{0.693}{R}$$

Therefore,

$$\text{Doubling time for publications Dt (a)} = \frac{0.693}{R(a)}$$

2.2 Objectives

To find out year wise publications in Osteosarcoma research

To identify document types contributed in Osteosarcoma research

To analysis language wise publications in Osteosarcoma research

To find out authorship pattern in Osteosarcoma research

To examine top fifteen institutions contributed in Osteosarcoma

To find top fifteen Sources contributions Osteosarcoma research

3. Results and Discussion

Table 1 shows that, year wise Osteosarcoma research publication during the study period from 2008 to 2017 global vs Indian output. Totally 6490 papers were published in Osteosarcoma research. In 2017, 1052 papers have published in Osteosarcoma research followed by 982 papers in 2016, 884 papers in 2015, 799 papers in 2014, 571 papers in 2013, 529 papers in 2012, 447 papers in 2011, 428 papers in 2010, 437 papers in 2009 and in 361 papers in 2008. Table 1 reveals as Osteosarcoma research publication in increasing trend. Moreover, amongst 97 countries contributed in Osteosarcoma research publications during the study period India's outcome occupied tenth place with 151 research papers in Osteosarcoma.

Table 2 shows that, Relative Growth Rate and Doubling Time, during the study period publications, Doubling Time mean value is 10.6. In 2008, the Osteosarcoma research publication was 361; gradually the research publications were raised to 1052 in the year 2017. The relative growth rate mean is 0.11

Table 3 shows that, document types in Osteosarcoma research publications; amongst 6490 papers contributed in the twelve various document types, research article type has occupied first position with 4533 papers, followed by Meeting Abstract has 1294 records, Review has 249 records, Editorial Material has 160 records, Letter has 101 records, Proceedings Paper has 44, Correction has 36 papers and Retracted Publication and Retraction 22

Table 1. Year wise Osteosarcoma publication research global vs Indian output

Sl. No.	Publication Years	World output	% of 6490	Indian Output	% of world output
1	2008	361	5.56	10	2.77
2	2009	437	6.73	13	2.97
3	2010	428	6.60	10	2.34
4	2011	447	6.89	12	2.68
5	2012	529	8.15	12	2.27
6	2013	571	8.80	4	0.70
7	2014	799	12.31	20	2.50
8	2015	884	13.62	24	2.71
9	2016	982	15.13	21	2.14
10	2017	1052	16.21	25	2.38
	Total	6490	100.00	151	2.33

Table 2. Relative Growth Rate and Doubling Time of Osteosarcoma research publication

Sl. No.	Publication Years	No of Records	Cumulative	W1	W2	R(a)	Mean (a) 1-2	Doubling Time	Mean Pt (a) 1-2
1	2008	361	361		5.88		0.09		14.06
2	2009	437	798	5.88	6.07	0.19		3.65	
3	2010	428	1226	6.07	6.05	0.02		34.65	
4	2011	447	1673	6.05	6.1	0.05		13.86	
5	2012	529	2202	6.1	6.27	0.17		4.08	
6	2013	571	2773	6.27	6.34	0.07	0.13	9.90	7.14
7	2014	799	3572	6.34	6.68	0.34		2.04	
8	2015	884	4456	6.68	6.78	0.1		6.93	
9	2016	982	5438	6.78	6.88	0.1		6.93	
10	2017	1052	6490	6.88	6.95	0.07		9.90	
	Total	6490					0.11		10.6

Table 3. Document type wise Osteosarcoma research publications

Sl. No	Document Types	Records	% of 6490
1	Article	4533	69.85
2	Meeting Abstract	1294	19.94
3	Review	249	3.84
4	Editorial Material	160	2.47
5	Letter	101	1.56
6	Proceedings Paper	44	0.68
7	Correction	36	0.55
8	Retracted Publication	22	0.34
9	Retraction	22	0.34
10	Book Chapter	19	0.29
11	News Item	9	0.14
12	Poetry	1	0.02
	Total	6490	100.00

records respectively, Book Chapter has 19 records, News Item has 9 records and Poetry has 1 record.

Table 4 indicates that, Language wise research publications in Osteosarcoma research during the study period. 6490 papers were published in eleven languages, amongst in English language 98.88 percent of papers have got published, followed by German language which occupies second place with 22 records, Spanish put in third place with 18 records, French in fourth place, Portuguese in fifth place, Chinese in Sixth place, Italian in seventh place, Czech in eighth place, Korean in ninth place, Turkish in tenth and Hungarian in eleventh place with single paper.

Totally 19609 authors contributed in Osteosarcoma research publications, among them, top fifteen authors are listed in this Table 5. Among the top fifteen authors, Gorlick R and Wang Y have occupies first and second place with 90 papers contributed, Zhang Y have third place with 80 papers, Picci P have fourth place with 76 contributions, Heymann D have fifth place with 69 papers, Zhou Y sixth place with 67 contributions, Tsuchiya H seventh place with 66 contributions, Ferrari S eighth place, Wang J ninth place with 63 contributions, Liu Y and Wang L have tenth and eleventh place with 62 contributions respectively, Redini F twelfth place with 58 contributions, Fuchs B have thirteenth place with 52 contributions, Hogendoorn PCW and Li Y have fourteenth and fifteenth place with 48 contributions respectively, remaining 19594 authors were contributed less than 48 contributions in this research during the study period.

Table 4. Language wise research publications in Osteosarcoma research

Sl. No.	Languages	Records	Percentages
1	English	6417	98.88
2	German	22	0.34
3	Spanish	18	0.28
4	French	13	0.20
5	Portuguese	7	0.11
6	Chinese	3	0.05
7	Italian	3	0.05
8	Czech	2	0.03
9	Korean	2	0.03
10	Turkish	2	0.03
11	Hungarian	1	0.02
	Total	6490	

Table 6 shows that authorship pattern in Osteosarcoma research publications during the study period. Among the 6490 papers, 2212 papers were six and above authors' collaborative, 1556 papers were five authors collaborations, 1002 papers are four authors collaborations, 935 papers are three authors collaborations, 476 papers is double authors collaboration, 309 papers are single author's contribution. Among the 6490 papers, majority of papers are collaborative contributions in this research during the study period, less than 5 percent of publications were contributed single author contribution.

Table 5. Top fifteen authors were contributed in Osteosarcoma research

Sl. No	Authors	Records	% of 6490
1	Gorlick R	90	1.39
2	Wang Y	90	1.39
3	Zhang Y	80	1.23
4	Picci P	76	1.17
5	Heymann D	69	1.06
6	Zhou Y	67	1.03
7	Tsuchiya H	66	1.02
8	Ferrari S	64	0.99
9	Wang J	63	0.97
10	Liu Y	62	0.96
11	Wang L	62	0.96
12	Redini F	58	0.89
13	Fuchs B	52	0.80
14	Hogendoorn PCW	48	0.74
15	Li Y	48	0.74

Table 6. Authorship pattern in Osteosarcoma research publications

Sl. No.	Authorship pattern	No. of Records	Percentages
1	Single	309	4.76
2	Double	476	7.33
3	Three	935	14.41
4	Four	1002	15.44
5	Five	1556	23.98
6	Six and Above	2212	34.08
	Total	6490	100.00

Table 7 shows that, top fifteen Osteosarcoma research papers published source list, totally 1115 source were published Osteosarcoma research papers, among the 1115 sources titles Pediatric Blood Cancer have first place with 338 records, Cancer Research sources contributed 285 with second place, Tumor Biology has third place with 191 records, followed by Oncotarget has fourth place with 155 records contributed, Oncology Letters has fifth place with 150 records contributed, Journal of Clinical Oncology has sixth place with 136 records contributed, Oncology Reports has seventh place with 132 records contributed, Plos one has eighth place with 123 records contributed, Molecular Medicine Reports has ninth place with 119 records contributed, International Journal of Clinical and Experimental Pathology has tenth place with 104 records contributed, International Journal of Oncology has eleventh place with 70 records contributed, Anticancer Research has twelfth place with 86 records contributed, Modern Pathology has thirteenth place with 61 records contributed, Bone and European Journal of Cancer has fourteenth and fifteenth place with 60 records contributed respectively. Moreover remaining 1110 sources were contributed below 60 records contributed in this research during the study period.

Table 7. Top fifteen Osteosarcoma research papers published Source

Sl. No.	Source Titles	Records	% of 6490
1	Pediatric Blood Cancer	338	5.21
2	Cancer Research	285	4.39
3	Tumor Biology	191	2.94
4	Oncotarget	155	2.39
5	Oncology Letters	150	2.31
6	Journal of Clinical Oncology	136	2.10
7	Oncology Reports	132	2.03
8	Plos one	123	1.90
9	Molecular Medicine Reports	119	1.83
10	International Journal of Clinical and Experimental Pathology	104	1.60
11	International Journal of Oncology	70	1.08
12	Anticancer Research	68	1.05
13	Modern Pathology	61	0.94
14	Bone	60	0.92
15	European Journal of Cancer	60	0.92

Table 8 indicates that, top fifteen Countries contributed in Osteosarcoma research publications, totally 97 countries were contribute in this research. Amongst the 97 countries only top fifteen countries were listed in this table, Peoples R China has first place with 2308 contributions, USA seconds place with 1549 records, Japan third place with 483 records, followed by Italy fourth place with 344 contributes, Germany fifth place with 241 contributions, South Korea sixth place with 231 contributions, France seventh place with 184 contributions, Canada eighth place with 172 contributions, England ninth place with 165 contributions, India tenth place with 151 contributions, Netherlands occupies eleventh place with 144 contributions, Taiwan have twelfth place with 133 contributions, Spain have thirteenth place with 129 contributions, Brazil have fourteenth place with 126 contributions, Australia have fifteenth place with 125 contributions among the top fifteenth place.

Table 9 indicates that top fifteen institutions contributions in Osteosarcoma research. Amongst the top fifteen institutions, Shanghai Jiao Tong University occupies first place with 198 records, University of Texas Md Anderson Cancer Center have second place with 145 records, Central South University have third place with 123 contributions, followed by China Medical University have fourth place with 114 contributions, Shandong

Table 8. Top fifteen Countries contributed in Osteosarcoma research

Sl. No.	Countries/Regions	Records	% of 6490
1	Peoples R China	2308	35.56
2	USA	1549	23.87
3	Japan	483	7.44
4	Italy	344	5.30
5	Germany	241	3.71
6	South Korea	231	3.56
7	France	184	2.84
8	Canada	172	2.65
9	England	165	2.54
10	India	151	2.33
11	Netherlands	144	2.22
12	Taiwan	133	2.05
13	Spain	129	1.99
14	Brazil	126	1.94
15	Australia	125	1.93

Table 9. Top fifteen institutions contributions in Osteosarcoma research

Sl. No.	Institutions / Organizations	Records	% of 6490
1	Shanghai Jiao Tong University	198	3.05
2	University of Texas Md Anderson Cancer Center	145	2.23
3	Central South <i>University</i>	123	1.89
4	China Medical University	114	1.75
5	Shandong University	111	1.71
6	IST Ortoped Rizzoli	104	1.60
7	<i>Jilin University</i>	92	1.41
8	<i>Zhejiang University</i>	90	1.38
9	<i>Leiden University</i>	83	1.27
10	Harbin Medical University	79	1.21
11	<i>Wuhan University</i>	78	1.20
12	TONGJI University	77	1.18
13	<i>Fourth Military Medical University</i>	76	1.17
14	<i>Second Military Medical University</i>	74	1.14
15	Memorial Sloan Kettering Cancer Center	72	1.10

University have fifth place with 111 records contribution, IST Ortoped Rizzoli have sixth place with 104 records, *Jilin University have seventh place with 92 records, Zhejiang University occupies eighth place with 90 records, Leiden University have ninth place with 83 records, Harbin Medical University have tenth place with 79 records, Wuhan University have eleventh place with 78 records, TONGJI University have twelfth place with 77 records, Fourth Military Medical University have thirteenth place with 76 records, Second Military Medical University have fourteenth place with 74 records, Memorial Sloan Kettering Cancer Center have fifteenth place with 72 records. Amongst the top fifteen institutions universities are more contributed compare with other institutions.*

4. Conclusion

Osteosarcoma diseases research publications indicate an increasing trend; among the documents types research articles have occupied first position with 4533 papers. Language wise publications in Osteosarcoma diseases research shows that English as medium of publication with 98.88% of papers contributed. Author wise contributions found that, Gorlick R and Wang Y have occupied top positions with 90 papers published

respectively, Zhang Y has third place with 80 papers. The source wise publication in Osteosarcoma contribution, amongst 1115 sources were Pediatric Blood Cancer have occupied first place with 338 records. For countries wise contribution in this research, China has first place with 2308 contributions, USA has second place with 1549 records, Japan has third place with 483 records. Collaborative publications are high compare with single author contribution. Moreover, India occupied in tenth place with 151 papers at global level of contribution.

5. References

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