

Research Contributions on Oral Cancer in India: A Scientometric Analysis

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ABSTRACT

Oral cancer is any malignant neoplasm which is found on the lip, floor of the mouth, cheek lining, gingiva, palate or in the tongue. Oral cancer is among the top three types of cancers in India. The incidence of oral cancer is highest in India, south and Southeast Asian countries. In India, 90 -95% of the oral cancers is squamous cell carcinoma. Based on oral cancer research data obtained from Web of Science database core collection, it is seen that with 2606 (6.92% global share) articles from India on oral cancer during 2010-2017, India ranks 4th in the world in terms of research paper output. About 75% of the Indian publications appeared during the period 2010-17. Tata Memorial Hospitals, All India Institute of Med Science and Annamalai University are the three institutions publishing the highest number of papers during the period. Chaturvedi and Nagini are the most productive authors in India contributing relatively higher number of publications in oral cancer. About 50% Indian publications are a result of international collaboration with 114 countries.

Keywords: Scientometrics, Oral Cancer, squamous cell carcinoma, India, Local citation Score, Global citation Score.

INTRODUCTION

The World Health Organization's International Agency for Research on Cancer (IARC) (<http://www.iarc.fr/>) has identified more than 100 types of chemical, physical, and biological carcinogens that cause cancer. Cancer research is focused on discovering new carcinogens, explaining how they cause cancer and providing insights into ways to prevent cancer. Peyton Rous discovered cancer, and the virus causing cancer came to be known as Rous sarcoma virus. Peyton Rous was awarded the Nobel Prize in 1966 for his discovery¹. In addition to viruses, chemicals and radiations also cause cancer and sometimes cancer is found to run in families².

Oral cancer is any malignant neoplasm which is found on the lip, floor of the mouth, cheek lining, gingiva, palate or in the tongue. Oral cancer is among the top three types of cancers in India³. Severe alcoholism, use of tobacco like cigarettes, smokeless tobacco, betel nut chewing and human papilloma virus (HPV) are the most common risk factors for oral cancer⁴⁻⁵. Oral cancer may also occur due to poor dental care and poor diet⁶. The incidence of oral cancer is

highest in India, south and Southeast Asian countries. In India, 90 -95% of the oral cancers is squamous cell carcinoma⁷. The international agency for research on cancer has predicted that India's incidence of cancer will increase from 1 million in 2012 to more than 1.7 million in 2035. This indicates that the death rate because of cancer will also increase from 680000 to 1- 2 million in the same period.

A case control study from India demonstrates that oral cancer is interrelated with low income. Low social economic class is interrelated with factors like nutrition, health care, living condition and risk behaviors which contribute to the development of oral cancer⁸. In many low-income and middle-income countries, including India, most of the population does not have access to a well organized and well regulated cancer care system. A diagnosis of cancer often leads to high personal health expenditures. Such expenditures can push entire families below the poverty line and may threaten social stability⁹. No significant advancement in the treatment of oral cancer has been found in recent years, though the present treatments improve the quality of life of oral cancer patients but the

overall survival rate of years has not improved in the past decades.

Cancer research is growing rapidly as evidenced by the increasing research publication output. Bibliometric analysis helps in studying the various facets of publication productivity in different research areas¹⁰⁻¹¹. Several bibliometric studies have reported analysis of cancer literature¹²⁻¹⁴. There are bibliometric studies on cancer of specific organs such as cervical cancer¹⁵⁻¹⁶, breast cancer¹⁷ and oral cancer¹⁸, while other bibliometric studies are on cancer in specific countries¹⁹⁻²¹ including a study on global perspectives²². Specific country based cancer studies include Arab countries²³, Brazil²⁴, France²⁵, Iran²⁶⁻²⁷, Mexico²⁸ and Nigeria²⁹. From the review of literature, it is seen that there are minimum number of bibliometric studies on oral cancer research from India so far. So, this paper attempts to fill this gap by presenting a Bibliometric report on oral cancer research in India.

OBJECTIVES OF THE STUDY

- To analyse the contribution of India in oral cancer research
- To study the research performance of Indian institutions in the area of oral cancer;
- To identify Indian oral cancer researchers;
- To find preferred journals in which Indian oral cancer researchers publish their works; and
- To examine the citations of journals from which oral cancer researchers acquire knowledge.

Table1. Research Output of Oral Cancer by Global Scientists

| Year | Global Output | % | Cum Global Output | Cum % | Indian Output | % | Cum. Indian Output | Cum % | India's share In % |
|--------------|---------------|---------------|-------------------|--------|---------------|---------------|--------------------|--------|--------------------|
| 2010 | 3634 | 9.64 | 3634 | 9.64 | 147 | 5.64 | 147 | 5.64 | 4.05 |
| 2011 | 3915 | 10.39 | 7549 | 20.03 | 222 | 8.52 | 369 | 14.16 | 5.67 |
| 2012 | 4315 | 11.45 | 11864 | 31.48 | 240 | 9.21 | 609 | 23.37 | 5.56 |
| 2013 | 4632 | 12.3 | 16496 | 43.78 | 282 | 10.82 | 891 | 34.19 | 6.09 |
| 2014 | 4633 | 12.3 | 21129 | 56.08 | 294 | 11.28 | 1185 | 45.47 | 6.35 |
| 2015 | 5443 | 14.45 | 26572 | 70.53 | 474 | 18.19 | 1659 | 63.66 | 8.71 |
| 2016 | 5710 | 15.15 | 32282 | 85.68 | 528 | 20.26 | 2187 | 83.92 | 9.25 |
| 2017 | 5398 | 14.32 | 37680 | 100.00 | 419 | 16.08 | 2606 | 100.00 | 7.76 |
| Total | 37680 | 100.00 | | | 2606 | 100.00 | | | 6.92 |

The research productivity on oral cancer by the global scientists is accounted to 37680. The publications on oral cancer increased with a slow space from 9.64% to 15.15 with the little fluctuations found during the study period 2010 to 2017. The Indian scientists' publications are 2606 in total which started with 147 from 2010

METHODOLOGY

The Web of Science (WOS) database was searched for records on oral cancer using the keywords oral cancer, Mouth Neoplasm, Neoplasm, Mouth Neoplasms, Oral Neoplasm, Oral Neoplasm, Oral Neoplasms, Neoplasms, Mouth, Cancer of Mouth, Mouth Cancers, Mouth Cancer, Cancer, Mouth, Cancers, Mouth Oral Cancer, Cancer, Oral, Cancers, Oral, Oral Cancers, Cancer of the Mouth available in title, abstract and keyword fields. The geographical location was kept as India. All these keywords used for tumors or cancer of the human oral and have been obtained from Medical Subject Heading (MESH) for oral Cancer available at PubMed of National Center for Biotechnological Information (NCBI). The following search string was used to retrieve data from WOS.

TS=(Mouth Neoplasm OR Neoplasm, Mouth OR Neoplasms, Oral OR Neoplasm, Oral OR Oral Neoplasm OR Oral Neoplasms OR Neoplasms, Mouth OR Cancer of Mouth OR Mouth Cancers OR Mouth Cancer OR Cancer, Mouth OR Cancers, Mouth OR Oral Cancer OR Cancer, Oral OR Cancers, Oral OR Oral Cancers OR Cancer of the Mouth) AND CU=(India). The Period of study is from 2010 to 2017. Eight Years recent trend in the field is analyzed.

The data were analyzed for tabulating the characteristics of publications, types of publications, productive countries, and then further analyzed for Indian contribution in terms of performance by institutions, journals, authors and their citation impact and Hirsch Index (h-Index) 30.

to 528 in 2016. The year 2017 shows a declining trend as 419. Table 1 explains the share of India in collaborating with the global level.

A total of 37,680 records were retrieved from WOS using the query discussed in the methodology. Table 1 gives the publication productivity of the top twenty five countries on

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oral cancer research in recent years. It was found that the USA was the most productive country with 31.34% of global share of publications on oral cancer. India is ranked 4th in terms of total publications with 2606 papers which is 6.92% of global literature. In terms of global share of publications during 2010, it was 4.05% (147 articles of 37,680 globally) that increased further to 5.67% (222 articles) during

2011. Since then the research by the Indian authors is continuously increasing i.e., 6.09% (282 articles) in 2013 to 9.25% (528 articles) of global output during 2016. The data was downloaded up to 25-12-2017. So it shows less in numbers i.e 419 articles (7.76%) in 2017. India has been ranked at the top 5 place leaving other developed countries behind in the research productivity in the case of oral cancer.

Table2. Most Productive countries and their publication share on Oral cancer research

| Country | Number of Publications of Countries year wise | | | | | | | | Total | Share of Publications of Countries' Percentage year wise | | | | | | | | Total |
|-------------|---|------|------|------|------|------|------|------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | |
| USA | 1139 | 1213 | 1261 | 1450 | 1366 | 1543 | 1542 | 1448 | 10962 | 31.34 | 30.98 | 29.22 | 31.30 | 29.48 | 28.35 | 27.01 | 26.82 | 29.09 |
| China | 207 | 286 | 388 | 483 | 617 | 768 | 813 | 894 | 4456 | 5.70 | 7.31 | 8.99 | 10.43 | 13.32 | 14.11 | 14.24 | 16.56 | 11.83 |
| Japan | 349 | 356 | 449 | 415 | 416 | 489 | 479 | 490 | 3443 | 9.60 | 9.09 | 10.41 | 8.96 | 8.98 | 8.98 | 8.39 | 9.08 | 9.14 |
| India | 147 | 222 | 240 | 282 | 294 | 474 | 528 | 419 | 2606 | 4.05 | 5.67 | 5.56 | 6.09 | 6.35 | 8.71 | 9.25 | 7.76 | 6.92 |
| England | 297 | 299 | 313 | 326 | 283 | 342 | 338 | 331 | 2529 | 8.17 | 7.64 | 7.25 | 7.04 | 6.11 | 6.28 | 5.92 | 6.13 | 6.71 |
| Italy | 245 | 238 | 275 | 264 | 271 | 345 | 347 | 309 | 2294 | 6.74 | 6.08 | 6.37 | 5.70 | 5.85 | 6.34 | 6.08 | 5.72 | 6.09 |
| Germany | 221 | 251 | 276 | 264 | 271 | 285 | 318 | 297 | 2183 | 6.08 | 6.41 | 6.40 | 5.70 | 5.85 | 5.24 | 5.57 | 5.50 | 5.79 |
| Thaiwan | 171 | 228 | 232 | 253 | 256 | 249 | 232 | 267 | 1888 | 4.71 | 5.82 | 5.38 | 5.46 | 5.53 | 4.57 | 4.06 | 4.95 | 5.01 |
| France | 162 | 166 | 181 | 209 | 195 | 230 | 211 | 251 | 1605 | 4.46 | 4.24 | 4.19 | 4.51 | 4.21 | 4.23 | 3.70 | 4.65 | 4.26 |
| Canada | 180 | 166 | 170 | 212 | 204 | 213 | 226 | 209 | 1580 | 4.95 | 4.24 | 3.94 | 4.58 | 4.40 | 3.91 | 3.96 | 3.87 | 4.19 |
| Brazil | 161 | 155 | 186 | 197 | 178 | 216 | 229 | 212 | 1534 | 4.43 | 3.96 | 4.31 | 4.25 | 3.84 | 3.97 | 4.01 | 3.93 | 4.07 |
| SouthKorea | 132 | 156 | 154 | 172 | 178 | 220 | 211 | 219 | 1442 | 3.63 | 3.98 | 3.57 | 3.71 | 3.84 | 4.04 | 3.70 | 4.06 | 3.83 |
| Spain | 154 | 126 | 173 | 165 | 155 | 173 | 166 | 171 | 1283 | 4.24 | 3.22 | 4.01 | 3.56 | 3.35 | 3.18 | 2.91 | 3.17 | 3.40 |
| Australia | 95 | 118 | 124 | 178 | 157 | 146 | 196 | 184 | 1198 | 2.61 | 3.01 | 2.87 | 3.84 | 3.39 | 2.68 | 3.43 | 3.41 | 3.18 |
| Netherlands | 118 | 122 | 121 | 153 | 121 | 168 | 180 | 145 | 1128 | 3.25 | 3.12 | 2.80 | 3.30 | 2.61 | 3.09 | 3.15 | 2.69 | 2.99 |
| Switzerland | 82 | 73 | 88 | 82 | 91 | 80 | 97 | 89 | 682 | 2.26 | 1.86 | 2.04 | 1.77 | 1.96 | 1.47 | 1.70 | 1.65 | 1.81 |
| Sweden | 55 | 64 | 71 | 71 | 63 | 80 | 96 | 71 | 571 | 1.51 | 1.63 | 1.65 | 1.53 | 1.36 | 1.47 | 1.68 | 1.32 | 1.52 |
| Turkey | 45 | 40 | 70 | 79 | 65 | 105 | 82 | 70 | 556 | 1.24 | 1.02 | 1.62 | 1.71 | 1.40 | 1.93 | 1.44 | 1.30 | 1.48 |
| Poland | 46 | 37 | 48 | 71 | 62 | 68 | 95 | 68 | 495 | 1.27 | 0.95 | 1.11 | 1.53 | 1.34 | 1.25 | 1.66 | 1.26 | 1.31 |
| Belgium | 35 | 52 | 55 | 71 | 61 | 75 | 80 | 61 | 490 | 0.96 | 1.33 | 1.27 | 1.53 | 1.32 | 1.38 | 1.40 | 1.13 | 1.30 |
| Denmark | 45 | 45 | 50 | 46 | 60 | 60 | 78 | 75 | 459 | 1.24 | 1.15 | 1.16 | 0.99 | 1.30 | 1.10 | 1.37 | 1.39 | 1.22 |
| Iran | 34 | 26 | 42 | 54 | 46 | 58 | 75 | 100 | 435 | 0.94 | 0.66 | 0.97 | 1.17 | 0.99 | 1.07 | 1.31 | 1.85 | 1.15 |
| Greece | 52 | 49 | 74 | 47 | 52 | 50 | 43 | 33 | 400 | 1.43 | 1.25 | 1.71 | 1.01 | 1.12 | 0.92 | 0.75 | 0.61 | 1.06 |
| Scotland | 45 | 56 | 43 | 46 | 32 | 42 | 44 | 40 | 348 | 1.24 | 1.43 | 1.00 | 0.99 | 0.69 | 0.77 | 0.77 | 0.74 | 0.92 |
| Israel | 49 | 35 | 34 | 57 | 36 | 47 | 47 | 35 | 340 | 1.35 | 0.89 | 0.79 | 1.23 | 0.78 | 0.86 | 0.82 | 0.65 | 0.90 |

RESEARCH PERFORMANCE OF INDIAN INSTITUTIONS ON ORAL CANCER

It was found that four institutes published more than hundred papers on oral cancer during 2010-2017. Table 3 provides publication output of top 25 Indian institutions and their citation impact. Unlike other Bibliometric measures, These 25 institutes have contributed 72.18% of the total Indian publications on oral cancer. The highest contribution came from Tata Memorial Hospital (351 papers), followed by All India Institute of

Medical Sciences (213 papers) and Annamalai University, Annamalainagar (193 papers). In terms of citation count, Tata Memorial Hospital tops the list with 916 local citations and global citation score is 5446. All India Institute of Medical Science has TLCS of 490 and TGCS 3980. It is followed by Annamalai University with higher Local citation score than AIIM i.e. 539 and it has TGCS as 2496. Yet the top most local citation and global citation is achieved by Regional Cancer centre 960 and 5171 respectively.

Table3. Most productive institutions in India working on Oral cancer (2010-2017)

| Rank | Institution | Publcn | % | TLCS | TGCS | Rank | Institution | Publcn | % | TLCS | TGCS |
|------|---|--------|-----|------|------|------|-------------------------------|--------|-----|------|------|
| 1 | Tata Memorial Hospitals, Mumbai | 351 | 9.5 | 916 | 5446 | 14 | CSIR, India | 43 | 1.2 | 38 | 1545 |
| 2 | All India Institute of Med Science, New Delhi | 213 | 5.8 | 490 | 3989 | 15 | Panjab University, Chandigarh | 40 | 1.1 | 12 | 442 |
| 3 | Annamalai University, | 193 | 5.2 | 539 | 2496 | 16 | King Georges Med | 36 | 1.0 | 37 | 220 |

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|----|--|------|-----|-----|------|----|---------------------------------------|-----|-------|-----|-----|--|
| | Annamalainagar, TN | | | | | | University, Lucknow | | | | | |
| 4 | Regional Cancer Centre, Trivandrum | 173 | 4.7 | 960 | 5171 | 17 | Govt Dental College, Tamil Nadu | 32 | 0.9 | 55 | 385 | |
| 5 | Manipal University, Karnataka | 90 | 2.4 | 59 | 562 | 18 | Indian Stat Inst, India | 32 | 0.9 | 105 | 512 | |
| 6 | University of Madras, TN | 78 | 2.1 | 136 | 1406 | 19 | Jamia Hamdard, New Delhi | 30 | 0.8 | 22 | 563 | |
| 7 | Chittaranjan National Cancer Inst. Kolkota | 75 | 2.0 | 150 | 1009 | 20 | Postgrad Inst Med Educ & Res, Haryana | 29 | 0.8 | 24 | 322 | |
| 8 | Gujarat Canc Res Inst, Ahmadabad | 68 | 1.8 | 198 | 1034 | 21 | Univ Delhi, New Delhi | 29 | 0.8 | 43 | 513 | |
| 9 | Int Agcy Res Canc, Lyan France | 58 | 1.6 | 598 | 3887 | 22 | Cent Drug Res Inst, Lucknow | 28 | 0.8 | 21 | 251 | |
| 10 | Kidwai Mem Inst Oncol, Bangaluru | 54 | 1.5 | 160 | 2776 | 23 | Jawaharlal Nehru Univ, New Delhi | 28 | 0.8 | 15 | 395 | |
| 11 | Indian Inst Technology, India | 50 | 1.4 | 41 | 449 | 24 | NIPER, India | 28 | 0.8 | 97 | 906 | |
| 12 | Indian Inst Chem Biol, Kolkota | 49 | 1.3 | 122 | 1070 | 25 | Govt Dent Coll & Hosp, India | 26 | 0.7 | 53 | 218 | |
| 13 | BanarasHindu University, Varanasi | 47 | 1.3 | 24 | 650 | | | | | | | |
| | Total | 1499 | | | | | (1499+381=1880) | 381 | 72.14 | | | |

RESEARCH OUTPUT OF INDIAN AUTHORS ON ORAL CANCER

Table 4. Most Productive Authors in India working on Oral cancer (2010-2017)

| Rank | Author | Publn | Percent | TLC | TLCP | TLCxS | TGC | TGCP | TLCR | TLC-B | TLC-E | h-index |
|------|------------------------------------|-------|---------|-----|-------|-------|------|--------|------|-------|-------|---------|
| 1 | Chaturvedi P, Tata Hosp. Mumbai | 90 | 2.4 | 180 | 25.02 | 95 | 941 | 140.05 | 232 | 37 | 14 | 18 |
| 2 | Nagini.S, Annamalai University | 71 | 1.9 | 294 | 22.78 | 92 | 1248 | 109.09 | 249 | 106 | 21 | 20 |
| 3 | NairMK, Reg.Can. Centr, Trivandrum | 63 | 1.7 | 248 | 11.34 | 144 | 1235 | 57.21 | 78 | 38 | 32 | 20 |
| 4 | Ralhan.R, Mt Sinai Hosp, | 62 | 1.7 | 306 | 20.92 | 116 | 1920 | 144.35 | 300 | 88 | 17 | 28 |
| 5 | Kumar.A, MolOncol Lab, Hyderabad | 57 | 1.5 | 38 | 5.63 | 25 | 683 | 91.94 | 64 | 13 | - | 16 |
| 6 | Kumar.S, CSIR, Lucknow | 56 | 1.5 | 60 | 8.84 | 35 | 549 | 89.26 | 88 | 9 | - | 14 |
| 7 | Kannan.S, ACTREC, Mumbai | 53 | 1.4 | 171 | 15.08 | 109 | 784 | 67.99 | 153 | 37 | 14 | 15 |
| 8 | Manoharan S, Annamalai University | 50 | 1.4 | 237 | 21.6 | 65 | 795 | 79.24 | 231 | 84 | 27 | 17 |
| 9 | Sankaranarayanan R, JBL, Bangalore | 50 | 1.4 | 533 | 33.13 | 379 | 2133 | 144.25 | 160 | 48 | 90 | 27 |
| 10 | D'Cruz AK, FHNO, Mumbai | 48 | 1.3 | 105 | 12.41 | 57 | 613 | 86.93 | 89 | 17 | 20 | 13 |
| 11 | Gupta S, ISM, Jharkhand | 48 | 1.3 | 60 | 5.39 | 40 | 474 | 75.34 | 50 | 10 | - | 11 |
| 12 | Shukla NK, AIIM, Newdelhi | 48 | 1.3 | 123 | 9.57 | 39 | 1019 | 82.25 | 154 | 39 | 1 | 20 |
| 13 | Kaur J, Panjab Univ | 45 | 1.2 | 158 | 10.03 | 70 | 1081 | 82.24 | 203 | 42 | 4 | 21 |
| 14 | Prabhash K, Tata Hosp. Mumbai | 44 | 1.2 | 67 | 13.38 | 18 | 205 | 39.29 | 100 | 20 | - | 10 |
| 15 | Singh M, PCDSR, Bhopal | 41 | 1.1 | 70 | 8.04 | 36 | 554 | 64.81 | 68 | 22 | - | 13 |
| 16 | Joshi A, TMH, Mumbai | 40 | 1.1 | 40 | 7.95 | 10 | 121 | 24.86 | 71 | 9 | - | 6 |
| 17 | Kuriakose MA, AIMS, Kerala | 39 | 1.1 | 43 | 6.39 | 34 | 293 | 41.39 | 51 | 3 | - | 11 |
| 18 | Das SN, AIIM, New Delhi | 38 | 1 | 86 | 10.93 | 32 | 410 | 52.5 | 63 | 26 | 8 | 13 |
| 19 | Panda CK, CNCI, Kolkota | 38 | 1 | 92 | 7.71 | 37 | 577 | 54.99 | 133 | 26 | 15 | 16 |
| 20 | Agarwal.JP., TataHosp.Mumbai | 35 | 1 | 56 | 8.67 | 28 | 490 | 79.62 | 31 | 9 | 1 | 13 |
| | | 1016 | 38.99 | | | | | | | | | |

TLC- Total Local Citation, TLCP- Total Local Citation per Year, TLCxS- Total Local Citation excluding Self citation, TGC- Total Global Citation, TGCP- Total Global Citation Per Year, TLCR – Total Local Citation Reference, TLC-B= Total Local Citation @ beginning, TLC-E= Total Local Citation @ End

Table 4 illustrates output and impact of India's most productive authors on breast cancer

research. There are 20 Indian authors who have published thirty five or more papers during 2010-2017. It was found that these 20 authors belong to 14 institutions of India. These 20 authors contributed 1016 papers, which accounts for 38.99% of the total Indian publications output. Four authors have published more number of papers than the group average (28.14% papers), of which the most productive author is

Chaturvedi.P, from Tata Hospitals, Mumbai who has published the highest number of 90 publications followed Nagini.S from Annamalai University with 71 papers, Nair MK with 63 papers and Ralhan.R has published 62 papers. The Next five authors have published 50 and more Publications in which an author belongs to Annamalai University reveals that this institution stands to be the one of the most productive institution on oral cancer.

Going by citation count, the highest number of global citations (TGC- 2133) were received by R. Sankaranarayan’s papers who had an average citation per paper (TLCP) of 33.13, followed by Ralhan.R with 1920 citations (TLCP=20.92) and Nagini.S of Annamalai University, Annamalainagar with 1248 citations (TLCP=22.78). Considering h-index as a factor of qualitative measure, it was found that Ralhan.R has highest h- Index with a value of 28, followed by Sankaranarayan (h-Index=27)31 and Kaur.J (h- Index=21). Both the authors Nagini S and Nair Mk have h-index 20 each.

JOURNAL PRODUCTIVITY IN TERMS OF INDIAN CONTRIBUTION

The Indian papers on oral cancer research were published in 934 national and international journals. Table 5 presents the list of journals in which 19 or more papers on oral cancer were published. The publication share of these 25 journals was 44.51% of total Indian research output. Many Indian authors preferred ORAL ONCOLOGY for publishing oral cancer research (193 papers). It has Impact Factor (IF) of 4.794 for the year 2017 JCR.

Other journals were Asian Pacific Journal of Cancer Prevention (98 papers; IF=2.39), Journal of Cancer Research And Therapeutics (98 articles; IF=0.750) and Indian Journal Of Cancer (98 articles; IF=0.497). As far as the Impact Factor (IF) is concerned, the Indian authors have published 27 papers in Journal Of Clinical Oncology which has IF 24.008 as the topmost IF in JCR 2017, followed by Cancer (19 papers) with IF of 5.997 and Journal Of Experimental & Clinical Cancer Research (20 papers) with IF of 5.189 (Table 5).

Table5. Top journals preferred for publishing Indian Oral cancer research

| S.No | Journal | Publn | % | IF | TLC | TLCP | TGC | TGCP | TCR |
|------|---|-------------|--------------|--------|-----|-------|------|--------|-----|
| 1 | Oral Oncology | 193 | 5.2 | 4.794 | 579 | 54.02 | 2999 | 272.06 | 445 |
| 2 | Asian Pacific Journal of Cancer Prevention | 98 | 2.7 | 2.39* | 207 | 28.20 | 955 | 126.61 | 260 |
| 3 | Journal of Cancer Research and Therapeutics | 98 | 2.7 | 0.750 | 107 | 14.69 | 488 | 74.75 | 165 |
| 4 | Indian Journal of Cancer | 76 | 2.1 | 0.497 | 78 | 13.36 | 316 | 50.36 | 156 |
| 5 | Journal of Clinical and Diagnostic Research | 75 | 2.0 | -- | 4 | 1.17 | 43 | 12.75 | 63 |
| 6 | International Journal of Cancer | 70 | 1.9 | 6.513 | 549 | 32.35 | 2707 | 170.69 | 182 |
| 7 | Journal of Oral Pathology & Medicine | 63 | 1.7 | 2.043 | 177 | 14.96 | 909 | 77.48 | 179 |
| 8 | Head and Neck-Journal for the Sciences and Specialties of the Head and Neck | 42 | 1.1 | 3.376 | 134 | 13.59 | 738 | 73.33 | 77 |
| 9 | Plos One | 42 | 1.1 | 2.806 | 0 | 0.00 | 619 | 107.75 | 133 |
| 10 | Tumor Biology | 41 | 1.1 | 3.650 | 29 | 6.88 | 153 | 34.67 | 118 |
| 11 | Journal of Evolution of Medical and Dental Sciences-Jemds | 36 | 1.0 | -- | 0 | 0.00 | 1 | 0.25 | 19 |
| 12 | Clinical Cancer Investigation Journal | 31 | 0.8 | -- | 0 | 0.00 | 1 | 0.25 | 29 |
| 13 | Research Journal of Pharmaceutical Biological and Chemical Sciences | 31 | 0.8 | 0.35* | 0 | 0.00 | 0 | 0.00 | 28 |
| 14 | Cancer Letters | 29 | 0.8 | 6.375 | 75 | 4.44 | 510 | 36.78 | 44 |
| 15 | Journal of Clinical Oncology | 27 | 0.7 | 24.008 | 5 | 0.51 | 1615 | 116.60 | 2 |
| 16 | Oral Diseases | 27 | 0.7 | 2.011 | 74 | 8.34 | 367 | 39.01 | 90 |
| 17 | Indian Journal of Otolaryngology And Head & Neck Surgery | 22 | 0.6 | 0.054* | 6 | 0.99 | 34 | 4.82 | 21 |
| 18 | Molecular and Cellular Biochemistry | 21 | 0.6 | 2.669 | 30 | 3.00 | 425 | 44.64 | 19 |
| 19 | Journal of Experimental & Clinical Cancer Research | 20 | 0.5 | 5.189 | 25 | 1.24 | 218 | 12.76 | 20 |
| 20 | Journal of Oral and Maxillofacial Surgery | 20 | 0.5 | 1.916 | 7 | 0.74 | 75 | 9.69 | 15 |
| 21 | Journal of Surgical Oncology | 20 | 0.5 | 2.993 | 45 | 3.23 | 276 | 20.67 | 38 |
| 22 | Rsc Advances | 20 | 0.5 | 3.108 | 22 | 4.97 | 94 | 22.48 | 34 |
| 23 | South Asian Journal of Cancer | 20 | 0.5 | -- | 4 | 1.00 | 20 | 5.67 | 69 |
| 24 | Cancer | 19 | 0.5 | 5.997 | 173 | 9.31 | 745 | 45.54 | 19 |
| 25 | Journal of Biomedical Optics | 19 | 0.5 | 2.530 | 0 | 0.00 | 345 | 37.62 | 78 |
| | Total | 1160 | 44.51 | | | | | | |

TLC- Total Local Citation, TLCP- Total Local Citation Per year, TGC - Total Global Citation, TGCP- Total Global Citation Per year, TCR – Total Cited Reference

Table6. Top cited Oral cancer journals of Indian research Scientists

| Name of the Journal | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Total | IF |
|---|------|------|------|------|------|------|------|------|-------|--------|
| Colloids and Surfaces B-Biointerfaces | 21 | 67 | 96 | 127 | 179 | 224 | 230 | 236 | 1180 | 3.887 |
| Journal of Clinical Oncology | 105 | 107 | 119 | 114 | 102 | 90 | 82 | 62 | 781 | 24.008 |
| Lancet | 40 | 51 | 53 | 75 | 110 | 86 | 79 | 62 | 556 | 47.831 |
| Jama Oncology | 0 | 0 | 0 | 0 | 0 | 9 | 134 | 335 | 478 | 16.559 |
| Journal of the National Cancer Institute | 65 | 53 | 68 | 63 | 60 | 70 | 43 | 49 | 471 | 12.589 |
| Journal of Controlled Release | 35 | 48 | 29 | 49 | 53 | 73 | 78 | 53 | 418 | 7.786 |
| British Journal of Cancer | 36 | 49 | 32 | 41 | 41 | 33 | 35 | 33 | 300 | 6.176 |
| Journal of Pharmacy and Pharmaceutical Sciences | 36 | 41 | 38 | 40 | 18 | 37 | 34 | 25 | 269 | 1.811 |
| Lancet Oncology | 26 | 25 | 30 | 25 | 36 | 25 | 32 | 25 | 224 | 33.90 |
| Addiction Biology | 12 | 23 | 25 | 17 | 26 | 19 | 21 | 21 | 164 | 4.603 |
| Theranostics | 0 | 0 | 0 | 0 | 11 | 42 | 63 | 46 | 162 | 8.712 |
| Nanotechnology | 3 | 21 | 22 | 23 | 22 | 24 | 14 | 18 | 147 | 3.44 |
| Respirology | 12 | 16 | 20 | 21 | 25 | 17 | 22 | 12 | 145 | 3.256 |
| International Journal of Cancer | 12 | 24 | 15 | 20 | 27 | 17 | 15 | 10 | 140 | 6.513 |
| Journal of Coordination Chemistry | 0 | 1 | 14 | 27 | 23 | 26 | 26 | 23 | 140 | 1.795 |
| Carbohydrate Polymers | 0 | 4 | 21 | 19 | 21 | 14 | 31 | 28 | 138 | 4.811 |
| Journal of Pharmacy And Pharmaceutical Sciences | 10 | 12 | 12 | 15 | 17 | 21 | 21 | 20 | 128 | 1.811 |
| Expert Opinion on Investigational Drugs | 0 | 6 | 17 | 25 | 18 | 14 | 26 | 20 | 126 | 4.03 |
| Clinical Cancer Research | 15 | 13 | 25 | 25 | 19 | 11 | 10 | 5 | 123 | 9.619 |
| Annals Academy of Medicine Singapore | 7 | 11 | 16 | 20 | 22 | 16 | 12 | 16 | 120 | 0.617 |

Table 6 presents the list of journals that the Indian authors cited for their publication purpose during the study period 2010 to 2017. There have been 20 top cited journals are listed in the table. Among them the top cited journal by the oral cancer authors is Colloids and Surfaces B-Biointerfaces which has got 1180 citations in total and it was increasingly cited year to year. It has IF 3.887. The next highly cited journal is Journal of Clinical Oncology with 781 citations followed by Lancet 556 citations and Jama Oncology with 478 citations. The other Journals have received less than 450 citations. As far as Impact Factor is concerned, the top most IF journal that has cited 556 times is Lancet (47.831-JCR 2017). The second top IF journal is Lancet Oncology (IF 33.90) followed by Journal of Clinical Oncology with IF 24.008 and Jama Oncology with IF 16.559. The Journal of the National Cancer Institute has recorded IF 12.589. The other Journals have IF less than 10.

CONCLUSION

Cancer has become one of the deadliest and life threatening diseases for the global population. Majority of research in the area of cancer is focused on discovering new carcinogens, causes, and discovery of drugs. The lifetime risk for mortality from cancer in India for both males and females is 61%. According to statistics, the number of deaths in 2012 due to oral cancer is 36463 in males and 15361 in females 7.

The present study presents a recent years perspective of Indian oral cancer research. The study reveals that the Indian oral cancer research is continuously increasing. Initially the research trend was low but the largest number (75%) of publications appeared during the last three years of the study. This is one of the few studies that may have found that a hospital (Tata Memorial Hospital) and a university (Annamalai University) have very active research activities as compared to other specialized research institutes.

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