Chapter VI

FINDINGS, SUGGESTIONS AND CONCLUSION

6.1. INTRODUCTION

In the previous chapter, detailed discussion on the analysis of data collected from the literature on malaria covered in bibliographic databases namely SCOPUS has been considered for the purpose of quantitative analysis. In this chapter, the major findings, observations and suggestions based on the outcome of the Chapter 4 are highlighted to prove the hypotheses and fulfill the stated objectives in Chapter 1. The findings and observations are broadly classified under appropriate headings with reference to the concerned table and figure numbers.

6.2. FINDINGS AND OBSERVATIONS

6.2.1 Quantum of Malaria Research Productivity

- SCOPUS is an international multidisciplinary database indexing over 15000 international peer reviewed journals in science and technology, besides more than 500 international conference/seminar proceedings.
• It is found that the number of hits comes to 81,974 of which 74,171 research literatures (90.48%) are directly related to Malaria during the period 1974 to 2013.

6.2.2 Growth of Malaria Literature

• A total of 74,171 publications on Malaria research can be seen in Scopus data base during the period 1974 to 2013.

6.2.2.1 Countrywise Distribution of Publications

• It is seen from the countrywise distribution of publications, USA stands first with 17366 (23.41%) publications where in India ranks in 4th place with 4568 publications. (Table 5.1, Fig 5.1)

6.2.2.2 Ratio of Growth in comparison with USA and India

• In comparison with USA, the growth of publications in the three countries UK(0.61), France (0.32) and India (0.32) has 0.25 and above.

• In comparison with UK, the growth of publications in the three countries USA (1.63), France (0.52) and India (0.43) has 0.40 and above.
• In comparison with France, the growth of publications in the three countries USA (3.15), UK (1.93) and India (0.83) has 0.75 and above.

• In comparison with India, USA (3.80), UK (2.33) and France (1.21), were little edge over in their contribution. (Table 5.2)

• In comparison with Germany, the growth of publications in the three countries USA (4.95), UK (3.03), France (1.57) and India (1.30) has 1.00 and above.

6.2.2.3 Average number of publications

• It can be seen that countries USA (434.15), UK (266.23), France (137.63) and India (114.20) are publishing more than 100 papers per year. (Table 5.3)

6.2.3 Language wise distribution of Articles

• It is found that the publications in English language (87.44%) dominate followed by French (3.59%) and German (1.76%). (Table 5.4, Fig 5.4)

6.2.4 Nature of Publication and Distribution of Articles

• It is revealed that the single most prevalent form of Global bibliographic form is journals (68.79%), followed by Reviews
(11.78%), Letters (4.41%), Conference Papers (3.23%), Gray Literature (3.17%) and only fraction of articles were found in other forms. (Table 5.5, Fig 5.5)

6.2.5 Year wise Distribution of Malaria Literature

- It is observed that in the year 2012 has recorded highest number of publications (6.33%) followed by 6.11% in 2011. The lowest numbers of publications (0.66%) are in 1977 (Table-5.6).
- It can be seen that the publication of Malaria research seems to be in curve linear trend of upward direction. During the last ten years there is a substantial increase in the publications. (Table 5.6, Fig. 5.5 and Fig. 5.6)

6.2.6 Ratio of Growth over the years

- The ratio of growth over 40 years period ranges between 0.86 and 1.20. The ratio of growth is maximum during the year 1990. (Fig 5.8)

6.2.7 Publications growth of the block period

- It is observed that the global output between the period 2004 and 2013 is 49.54% which shows a substantial growth in the Malaria Research literature. (Table 5.7, Fig 5.9, Fig 5.10)
6.2.8 Relative Growth Rate (RGR)

- It is observed that the Relative growth rate of contributions ranges from 0.0429 to 0.62. Average RGR of global output works out to 0.27 and the doubling time ranges from 0.1084 to 16.1806 over the period. In the year 2013 the Dt(P) is 16.1806. (Table 5.8, Fig 5.9 and 5.10)

6.2.9 AUTHORSHIP PATTERN

6.2.9.1 Authorship Pattern in Malaria

- It is evident that nearly 80.9% were collaborative research either by two authors or more than two authors in the case of global publications. Nearly 2.5% of publications have no authors. (Table 5.9)

- Single author contributions for every year ranges between 9.1% and 4.6%. Every year two author’s contribution ranges from 0.3% to 1.1%. Similarly for three authors it ranges between 0.2 and 1.2. (Table 5.10)

- There is a considerable reduction in single author CAGR (13.62%) whereas the two authors (25.64%), three authors (34.37%) so on so forth. (Table 5.11)
• It is observed that during all block year the collaborative research value of CAI was more than 100 which shows that they preferred to work in small and big teams. (Table 5.12)

• CAGR shows the negative trend in solo research and where as for collaborative research it shows positive trend. (Table 5.13 and 5.14)

• It is observed that the Degree of collaboration(DC), Collaborative Coefficient (CC) and Collaborative Index (CI is more from 2010 onwards.(Table 5.15)

6.2.10 Citation of Papers

• During the 40 years 74171 publications were found with a total output 4,97,920 pages. Average page per article works out 6.71 pages. (Table 5.16)

• It is observed that number of publications, pages, authors and citation were more during the last four block years viz. 1994-1998, 1999-2003, 2004-2008 and 2009-2013. (Table 5.17)

• During the year 2010 onwards, the Malaria research articles were ranges 7 or 8 pages. Average pages during the 40 years of research come to 6.46 pages. (Table 5.17)

• It is found that the importance of citation in Malaria research has been realised from the block period of 1989-1994. (Table 5.17)
6.2.11 Highest Contributed Institutions

- It is observed that 21.03% of the contributions were published by 15 institutions. Among the top 15 London Scholl of Hygiene & Tropical Medicine with 2393 (3.23%) publications top the list followed by Mahidol University (1710, 2.32%) and Liverpool school of Tropical Medicine (1170, 1.58%). (Table 4.18)

6.2.12 Subject Area Covered in the Articles

- 74171 articles cover 28 topics. Of which majority of the articles covers the subject such as Medicine, Immunology and Microbiology, Biochemistry, Genetics and Molecular Biology and Pharmacology, Toxicology and Pharmaceutics. (Table 5.19)

6.2.13 Authors of More Contribution

- 17 authors contributed more than 200 articles in malaria research accounting to 7.11%.

- While, N.J. (586), Greenwood, B.M (465) and Looareesuwan (453) occupies the first three position. (Table 5.20)
6.2.14 Highly Cited Papers

- 50 papers were have more than 625 citations. (Table 5.21)
- A two authors paper cited 3630 times was published in the year 1997. It is followed by 3393 citations was authored by two authors. The next highest cited paper (3184) is also two authors papers which is published in 1976.
- The age of the highly cited paper ranges between 3 and 37 years. (Table 5.21)

6.2.15 Indian Contribution

- During 1974-2013, about 2924 papers were published on malaria by Indian authors. The average number of papers produced per year was 73.01. The highest numbers of papers (229) were published in the years 2012. (Table 5.22)
- It can be seen from the table that the Indian publication on Malaria research seems to be in linear trend. During the last ten years there is a substantial increase in the publications. This indicates that the awareness and importance has been in increasing trend.
- The awareness of research has gaining momentum only after 2000. (Table 5.22).
• 13 different bibliographic forms can be seen in Indian contributions. 76.13% of publications are journal articles. (Table 5.24, Fig 5.14).

• 19% of publications alone Single author contributions. 81% are collaborative research. (Table 5.26, Fig.5.15).

• Only 824 of the Malaria research articles in India. USA has collaborated 224 publications. The Indian authors collaborated with 20 countries for their contribution. USA, UK, Switzerland and Canada. Germany are the top five countries that were collaborated (Table 5.29).

• It is found that Indian Institute of Technology, Delhi has contributed more than 309 (6.17%) publications and seems to be the major contributor from India followed by PSG College of Technology 217 (4.33%), University of Mumbai 141 (2.82%) and Technocrat Society 127 (2.54). (Table 5.30).

• Majority of the Malaria research appeared in Indian journal of Malariology (225) followed by Journal of Communicable Diseases (159), Indian Journal of Medical Research (132), and Journal of Vector Borne Diseases (85) (Table 5.31).
6.2.16. Highest Cited Indian Papers

- 1845 Indian articles were cited 24503 times with an average citation of 13 times per paper.
- Sharma V P has contributed more than 139 publications followed by Dash A P (103), Singh N (94) and Subbarao S K (62). (Table 5.34)
- The age of highly cited paper ranges between 1 to 17 years. Collaborative research has highest citations. Four solo research papers were highly cited. 633 citations of papers were authored by seven authors that was published in the year 2007. (Table 5.36)

6.2.17. Mapping of Top 10 Authors Publications

- Mapping the publication nature of top ten others both global authors were attempted (Table 5.37)
- Similarly top ten Indian authors publications were mapped. (Fig. 5.38)

6.3 FINDINGS IN RELATION TO HYPOTHESES

The study undertaken has indicated that the hypotheses:

1. Research productivity in Malaria research is comparatively higher in developed countries. There is significant difference on the publications with respect to country wise distribution.
2. There exists a significant level of difference between Malaria research
performance of Indian scientists and scientists of other countries.

3. Among the third world countries, India contributes substantially in Malaria
research.

4. Journal plays major role in publishing papers on Malaria research. There is
a significance difference in form of publication in publishing research
papers.

5. Maximum number of articles published in English language.

6. There exist the collaborative research dominates in the field of Malaria
research.

6.4 DIRECTIONS FOR FURTHER RESEARCH

The present study of research productivity on Malaria offers avenues for
further research on the following areas. The extent and pattern of collaboration
research in the subfields of Malaria research.

1. The citation patterns in Malaria research contributions.

2. Mapping the literature on Malaria

3. Study of Indian output on Malaria

4. Impact of Malaria research literature on the branches of Sociatial applications.
6.5 CONCLUSION

The literature output of global Malaria research has been studied in the light of the Indian research output. The study reported the findings to determine the publication trend with respect to growth of literature on countrywise, yearwise, blockyearwise, language-wise and document type.

- Publications data included in the Scopus database alone have been taken up for the study.
- 74171 data has been identified from the Scopus data base listed during the period 1974 to 2013 only taken up.

The objectives, stated in the chapter 3.1, of the study formulated for the purpose were thoroughly investigated and reported. The results computed are quite encouraging particularly on the implications of malaria research output between global and Indian context in the facets country wise contribution, language wise contribution, document type, yearwise, block yearwise. Further authorship pattern, collaboration pattern such as collaborative coefficient, collaborative index, relative growth rate, doubling time. Besides highly cited papers both global and Indian point of view were computed. Similarly highest number of publications both global and Indian were not only identified, mapping also carried out. But there is always scope for improvement for betterment of projection of growth of literature output on the discipline.