CHAPTER 5
CONCLUSION AND IMPLICATIONS

5.1 Introduction

The present study “Scientometric analysis of Journal of antimicrobial Chemotherapy” was concerned with the content analysis of the Journal of antimicrobial Chemotherapy since 1975 to 2010. Information about the journal and its content was collected from journals website. The conclusions of the analysis from chapter 3rd and 4th were summarized and included in this unit. The findings in relation to the objectives (1.4) and hypothesis (1.5) have been discussed.

5.2 Conclusion / findings

The conclusions / findings have been presented under the following headings.

- Journal of Antimicrobial Chemotherapy
- Author Productivity
- Authorship Patterns

5.2.1 Journal of Antimicrobial Chemotherapy

1. The Journal of Antimicrobial Chemotherapy is a peer-reviewed medical journal which covers laboratory aspects and clinical use of antimicrobial agents. It is published by Oxford University Press on behalf of the British Society for Antimicrobial Chemotherapy and was established in 1975. All content is available for free after 12 months while authors also have the option to have their articles published immediately as open access.

2. The Journal is Abstracted and indexed in Academic Search, Biological Abstracts, BIOSIS Previews, CAB Abstracts, Chemical Abstracts, CINAHL Plus, Current Contents/Clinical Medicine, Current Contents/Life
Sciences, Elsevier BIOBASE, Embase, Global Health, Index Medicus/MEDLINE/PubMed, Science Citation Index, Scopus, Tropical Diseases Bulletin.

3. Published monthly, the Journal features original articles on the laboratory aspects and clinical use of antimicrobials including antibacterial, antiviral, antifungal, and antiprotozoal agents.

4. In addition to the wealth of primary papers, the journal carries review articles offering in-depth discussion on matters of topical concern. Lively leading articles offer incisive coverage of recent advances and controversies.

5.2.2 Author Productivity

1. Present study covered 392 Issues from 1975 to 2010 in which 10638 articles were published. All these 10638 articles were written by 46232 authors. The average numbers of authors per paper were 4.34. The rank list of authors was prepared by two different methods first a general list of authors by giving equal weightage to every author and second by giving weightage to first author only.

2. The total number of authors (author at any position) it is was found that Richard Wise, who participated in a maximum of 202 publications stood at first rank and is the most productive author, while David M. Livermore contributed 154 articles and stood at second rank followed by Jenny M. Andrews, D. S. Reeves and A. P. MacGowan at third, fourth and fifth rank respectively.

3. Amongst the author at any position Richard Wise contributed maximum 202 publications during 1975-2010 hence is the key author.

4. It is concluded that authors at any position top 20 ranking authors totaling 27 authors almost 22 authors (highlighted bold) were from editorial board which is almost 81 % among the top 20 authors. The journal had 263
experts on their editorial board and amongst them 225 had published 3638 articles during 1975-2010 which is 34.19 % of total articles (10638) published by 46232 authors. This indicates that “Experts on editorial and advisory board writes more papers in the journal” (Hypothesis No. 5) is Valid.

5. It is concluded while analyzing authorship at first position that 10041 authors had written articles with first position. It is noteworthy that again Richard Wise, who contributed 47 publications at first position and placed at first rank, while Jennifer M. Andrews contributed 43 articles with second rank, J. M. T. Hamilton-Miller and David M. Livermore both of them contributed 36 articles are at third rank, Laura J. V. Piddock and A. L. Barry, fourth and fifth rank respectively.

6. Amongst the author at first position Richard Wise contributed maximum 47 publications during 1975-2010 hence is the key author.

7. It is noteworthy that authors contributing at first position 13 authors among the 26 authors (mark bold) are from the editorial board. This indicates that “Experts on editorial and advisory board writes more papers in the journal” (Hypothesis No. 5) is Valid.

8. The total numbers of 10638 publications of 46232 authors were divided into 3 equal zones, while number of authors writing similar numbers of papers in each zone are increasing which indicates that data does not fits into the Bradford’s law of scattering. According to Bradford, the relationship between the zones is 1: a: a^2 while the relationship in each ones of the present studies is 1512: 8969: 15264.

9. While applying Lotka’s Law to the collected data it was found that even though number of authors writing more papers are decreasing but this is not in the ratio as expected by Lotka’s Law. This indicates that Lotka’s Law fits into the data verbally and not mathematically.
10. It is concluded that distribution of authors and their contributions is characterized by dispersion of papers over a large number of researchers with low productivity and the concentration of contributions is in the hands of few highly productive authors. It can be observed that 70.20% of authors have published 8258 papers, and they represent as a whole 41.26% of total contributions. On the other hand 29.80% of the total authors have contributed 11756 papers representing 58.74% of the total papers produced.

11. Considering the applicability of 80/20 Rule, it can be observed from table no. 4.1.1.4.1 that, square root of total authors is 160 contributed 11.28% of the total papers, which is much below 50% as predicted by De Solla Price. Similarly it is observed that 20% of the authors contributed only 54.35% of the total papers. This is much below the 80% as predicted by 80/20 Rule. It can be observed that 30% of the authors contributed 60.65% of the total papers, and 40% of authors have contributed 66.27% papers, 50% authors contributed 71.89 while slightly more than 80% of the authors have contributed to 88.76% of the total papers. Which means neither price square root law nor 80/20 rule fits into the present set of data.

12. An attempt was made to analyze the growth of publication, relative growth rate and doubling time of literature output of Journal of Antimicrobial Chemotherapy. It is concluded that the exponential growth of Journal Of antimicrobial Chemotherapy for the period 1975 to 2010 (35 years). The most productive year was 2008, as total productivity in this year was 534, followed by (499) 2007 and (490) in 2009.

13. While apply the relative growth rate and doubling time model it is seen that the Relative Growth Rate has decreased from 1975 (0.73) to 2010 (0.05) in the span of 35 years.

14. While analysing the doubling it is seen that doubling time increased when calculated year wise. The doubling time increases from 0.95 in 1975 to
15.14 in 2010. This suggests that the growth rate decreases as the time period increases.

15. While determining the year wise productivity of key authors it is concluded that R. Wise is the most productive author and contributed 202 articles. He consistently published articles throughout the span of 35 years under study, except 1976, 2005 and 2008-2010. The most productive year for R. Wise was 1990 in which he contributed 13 articles.

16. The second key author David M. Livermore is also the most consistent author contributing 154 articles. Starting from 1975 to 2004 he consistently published articles throughout the span of 35 years under study, he has not published any article after 2004. It is worth noting that the most productive year for David M. Livermore was 2004 in which he contributed 17 articles which is highest in a single year among all five key authors.

17. The third key author J. M. Andrews has consistently 143 articles and consistently contributed throughout the span of 35 years except 1996. The most productive year for J. M. Andrews was 1991 in which he contributed 11 articles.

18. Subject wise productivity was determined through keywords provided by authors. It can be noted that the highest number of articles are on pharmacology 1214 (9.58%) during the study period followed by drug resistance 1075 (8.48%) and drug effect at third position with 807 keywords (6.37%). However it is noteworthy that 100% of the articles are related to laboratory aspects and clinical use of different antibiotics against different diseases in humans.

19. It can also be noted that articles with keywords Antimicrobial agents/antimicrobials, Antibacterial Agents and antiviral/antiviral-agents jointly accounts for 8.86 % of total keywords. This indicates that the hypothesis “Journal of antimicrobial Chemotherapy is a forum exclusively devoted to laboratory aspects and clinical use of
antimicrobials including antibacterial, antiviral and antiprotozoal agents". (Hypothesis No. 3) is valid.

20. It is concluded while analyzing the data by institution wise productivity pattern. The top 20 institutions were University of Paris at first rank with highest productivity of 536 authors contributed from this university, University of Bristol with 530 authors at second position and University of Barcelona with 496 authors at third position. It is interesting to note that amongst the top 20 institution, maximum productivity is drawn from universities as an institution. Hence we can say that academic institutions are most productive and contributes maximum no of research articles to this journal.

21. The Journal of Antimicrobial Chemotherapy publishes between two and eight supplements each year. These include Working Party reports of the British Society for Antimicrobial Chemotherapy, and original publications on pre-clinical and clinical aspects of drugs in development or the role of established drugs in specific therapeutic areas. The journal consist 150 supplements published during 1975 to 2010. There were 2309 articles published in these supplement.

22. Supplements published along with the Journal of Antimicrobial Chemotherapy under study covered 150 supplements from 1975 to 2010 in which 2309 articles were published. All these 2309 articles were written by 4746 authors. The average numbers of authors per paper were 2.05.

23. Richard Wise, who participated in a maximum of 48 publications and placed in the first rank and is the most productive author, while Roger G. Finch contributed 27 articles and stood at second rank followed by Ian Phillips (25 articles), D. S. Reeves (25 articles) and David Speller (18 articles) at third, fourth and fifth rank respectively.

24. It can also be noted that top 10 ranking authors totaling 19 authors almost 7 authors (highlighted bold) were from editorial board which is almost 38
% among the top 10 authors. All top 10 authors (19 authors) published 292 articles and those on editorial board (7 authors) published 161 articles which is almost 55.13 %. This indicates that “Experts on editorial and advisory board writes more papers in the journal” (Hypothesis No. 5) is valid.

25. It is can be seen while analyzing supplement data that top ten authors with their contribution as a first author, 1685 authors had written articles with first position. It is noteworthy that again Richard Wise, who contributed 23 publications at first position and placed at first rank, while R G Finch contributed 19 articles with second rank, D M Livermore and P. G. Davey both of them contributed 11 articles are at third rank, D Felmingham and Harold C. Neu, fourth and D. A. Leigh and D. S. Reeves at fifth rank. It can also be noted from the above table that 11 authors among the 31 authors are from the editorial board. Top 10 ranking authors (31 authors) contributed 220 articles out of which 11 authors from editorial board contributed 108 articles which are 49% of top ten authors. This indicates that “Experts on editorial and advisory board writes more papers in the journal” (Hypothesis No. 5) is valid.

26. While determining the year wise productivity of supplement published along with the journal is seen that shows the irregular growth of supplements of Journal of antimicrobial Chemotherapy for the period 1975 to 2010 (35 years). The most productive year was 1983, as total productivity in this year was 183, followed by (178) 1982 and (169) in 1986 after 1993 there is consistently low productive growth rate is seen with up’s and down.

27. While determining relative growth rate of supplements it concluded that RGR has consistently decreased from 1976 (0.39) to 2010 (0.01) in the span of 35 years.

28. While calculating doubling time for supplements there is inconsistency in doubling. The doubling time increases over the entire years under the
study. This suggests that the growth rate is not constant as the time period increases.

29. While determining year wise productivity of key authors from supplement to JAC its again R. Wise who is the most productive author and contributed 48 articles to supplements of Journal of Antimicrobial Chemotherapy. He consistently published articles throughout the span of 35 years under study, with few exceptions. The most productive year for R. Wise was 1986 and 1988 in which he contributed 5 articles each.

30. The second key author Roger G. Finch is also the most consistent author contributing 27 articles. Starting from 1984 to 1988 he consistently published articles during this period, he has not published any article after 2000. It is worth noting that the most productive year for Roger G. Finch was 1993 in which he contributed 6 articles.

31. The third key author Ian Phillips has consistently 25 articles and consistently contributed throughout 1978-2000 except 1995-77 and 2001-2010. The most productive year for Ian Phillips was 1986 in which he contributed 6 articles. D. S. Reeves publishes 25 articles during 1977-2005. The most productive year for D. S. Reeves was 1994 in which he contributed 3 articles. David Speller published 18 articles and his most productive year was 1990 with 7 articles and which is highest in a single year among all five key authors.

5.2.3 Authorship Pattern

32. While determining the authorship pattern of Journal of Antimicrobial Chemotherapy. It could be noted that more than 10 authored papers rank first in order sharing 58%. The next place is recorded by 5 to 9 authored papers sharing 15% of the total research contributions. Three authored contributions take that third position in order occupying 8% of the total research output during the study period followed by between two and four authored (7%). The least percentage was recorded by Single authored
publications with 5%. A significant note of the study is that the majority of the publications are contributed by multiple authors.

33. It is further observed that, in the year wise authorship pattern the highest number of single authored publications was 45 in the year 1988 and highest number of multiple authors was 608 during the year 2008, which indicates that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

34. The Degree of Collaboration of authors from Journal of Antimicrobial Chemotherapy during 1975-2010. It was observed that Degree of Collaboration consistently increased over the years and the highest was recorded in the year 2010 with 0.98. Even though there were fluctuations in degree of collaboration, since 1975 (0.56) it was progressively increased which indicates that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

35. It can be seen that the collaborative efforts from the researcher increases during recent times. The study under research shows that during 1975 the percentage of single authored and multi-authored papers were 31(0.21%) and 40(0.38%) respectively and the trend is consistent during 1975-2010. It is very interesting to note here that the trend of research is in favors of team research.

36. It clearly shows that the percentage of multi-authored papers is far more than that of the single-authored papers. They are 89.53% (multi-authored papers) and 10.47% (single-authored papers) respectively. It indicates that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

37. While determining institution wise authorship pattern it is observed that highest productivity is drawn from Universities with 22142 (48%) authors are affiliated to different universities followed by Hospitals with 9600 (21%) authors, Research Organizations with 7420 (16%) authors,
Government Organisation with 4634 authors (10%) and least productivity with 2436 authors (5%) is affiliated to Pharmaceutical companies.

38. The total articles under study (10638) the department wise authorship pattern it is prominently seen that Authors from department of Microbiology are leading contributors with 7169 (15.51%) followed by Department of Medicine with 6306 (13.64%) authors, department of Infectious diseases is at third position with 3894 (8.42%) authors. It can be noted from top 40 departments with 36632 (79.24%) contributed to the Journal of Antimicrobial Chemotherapy that majority of them are microbiologist and pharmacists. It can also be noted that there are 652 (1.41%) authors whose affiliation is not mentioned while providing authors information hence considered as unknown. From the figure 4.1.2.4 it can be seen that 45.5% are microbiologists and 33.49% are Pharmacists while 21% are from miscellaneous represents departments. Hence it can be concluded that “Majority of Microbiologist and Pharmacist give input to the journal”, (Hypothesis number 2) is valid.

39. While determining authorship patterns of supplements to Journal of Antimicrobial Chemotherapy. It could be noted that single authored papers rank first in order sharing 32%. The next place is recorded by 5 to 9 authored papers sharing 20% of the total research contributions. Two authored contributions take that third position in order occupying 18% of the total research output during the study period followed by between Three and four authored papers (17%) and (12%) respectively. The least percentage was recorded by more than ten authored publications with 1%. A significant note of the study is that the majority of the publications are contributed by multiple authors which indicate that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

40. Degree of Collaboration of authors from supplements of Journal of Antimicrobial Chemotherapy during 1975-2010. It was observed that Degree of Collaboration consistently fluctuates over the years and the highest was recorded in the year 2006 with 1.00. Even though there were
fluctuations in degree of collaboration, since 1975 (0.54) it was progressively increased which indicates that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

41. Single V/s Multiple authorship pattern for supplements of Journal of Antimicrobial Chemotherapy the data shows that during 1975 the percentage of single authored and multi-authored papers were 13(0.56%) and 15(0.65%) respectively and the trend is fluctuating during 1975-2010. It is very interesting to note here that the trend of research is in favor of team research.

42. It clearly shows that the percentage of multi-authored papers is far more than that of the single-authored papers in supplements of Journal of antimicrobial Chemotherapy. They are 68.30% (multi-authored papers) and 31.70% (single-authored papers) respectively. It indicates that “Teams increasingly dominate solo authors in the production of knowledge.” (Hypothesis no. 4) is valid.

43. The institution wise authorship pattern for supplements to Journal of Antimicrobial Chemotherapy under study It can be seen that highest productivity is drawn from Universities with 1470 (30.97%) authors are affiliated to different universities followed by Hospitals with 1398 (29.46%) authors, Pharmaceutical companies rank third with 991 (20.88%) while Research Organizations with 728 (15.34%) authors, government organization with 99 authors (2.09%) and 60 authors affiliation was not reported which is (1.26%) of total 4746 authors. It is worth noting that universities are leading in research publications followed by hospitals and pharmaceutical companies in supplements to Journal of Antimicrobial Chemotherapy.

44. The authors contributing to the supplement of journal of Antimicrobial Chemotherapy during 1975-2010 are from 41 countries.
45. It can be seen that USA rank first with 1089 authors (22.95%) and is topmost contributing country to supplements to Journal of Antimicrobial Chemotherapy, while UK rank second with 945 (19.91%) authors, France rank third with 739 (15.57%), England rank fourth with 347 (7.31%), and Germany rank fifth with 316 (6.66%) authors contributing there articles, however there are no contributions from India authors. It can also be noted from the table and figure 4.2.7 that majority of authors contributed in the supplement to Journal of Antimicrobial Chemotherapy are from European countries (Highlighted in Bold). Authors from European continent (69.28%) are the highest contributors to the supplements. This indicates that “majority of authors writing in this journal are from European countries”. (Hypothesis No. 1) is valid.

5.3 Implications of Results

Based on the results of Journal of Antimicrobial Chemotherapy under study for the publication since 1975-2010 following are the implications and suggestions for authors and for the journal.

Implications for Authors:

1. While collecting bibliographic details of authors is was prominently seen that the affiliation of authors to the institutions are missing, which was stumbling block in determining institution and department wise authorship pattern, hence the authors are requested to provide their bibliographic details as per the guidelines provided by publishers.

2. Authors are requested to use adequate and proper key words so that the subject matter is understood before reading the full-text article.

Implications for Journal:

1. While analyzing the articles published in the journal understudy by the subject, the keywords given by the journal was used, however it was found confusing as subjects were overlapping hence it is suggested that clear classification be given.
2. Place and country of Publication is not defined properly specific name of the country is used rather than using continents.

3. It is also suggested that either Journal of antimicrobial Chemotherapy or the British Society for Antimicrobial Chemotherapy (BSAC) evolve their own thesaurus.

5.4 Areas for further studies

1. There is further scope for conducting scientometric studies for the remaining period from 2011 to till date of Journal of Antimicrobial Chemotherapy.

2. Citation analysis of the Journal of Antimicrobial Chemotherapy can be undertaken for the entire period since inception.