CHAPTER 5

FINDING, SUGGESTIONS AND CONCLUSION

Findings

The findings of the present study are based on the analysis and interpretation,

The analysis results show document wise publications of research output on epidemiology. It could be inferred from the above discussion that the journal articles dominate other documents of publications. It is due to the pivotal place of journals as a medium of scientific communication than any other form of publication, majority of the epidemiology scientists published their research papers in journals.

The result of year wise distribution of research output on epidemiology is examined; it is found that 2013 has more publications than other years. Next the 2010 occupies second position among the fifteen years, and 2011 occupies third place and 1999 has the least publication.

The findings of the national (India) wise research output in epidemiology studies indicate the following facts. The year 2008 has predominant distribution followed by the year 2012 with second predominant distribution and 2001 has very less distribution among the fifteen years.

It could be observed from this analysis that North American continent has taken the first place for contributing the research output on epidemiology. The European continent stands in the second rank and the Asian continent stands in the third rank, followed by Oceania continent fourth in order, South American continent fifth and African continent sixth rank of this study.
The continent wise analysis shows that in the South American continent, only six countries contribute; among the six countries Brazil has a predominant place, Argentina has second place and the lowest contribution is by Venezuela. While the global level percentage of South American has 1.33 per cent, among the 1.33 per cent Brazil takes 0.92 per cent, Argentina takes 0.19 per cent, Chile takes 0.10 per cent and the other three countries take 0.12 per cent.

The finding of country wise analysis shows that in the Oceania continent, only two countries contributed. Among the two countries, New Zealand has first place and Australia has second place of publications. The global level percentage of Oceania countries has 1.61; New Zealand obtained 0.97 per cent and Australia obtained 0.64 per cent.

The result of continent wise analysis shows that in the African continent, only two countries contributed. Among the seven countries South Africa occupied the first position, Nigeria occupied the second position, and Ethiopia and Egypt occupied respectively the third position. Further the global level per cent of African countries has 0.32 per cent; South Africa has 0.18 per cent, Nigeria has 0.08 per cent and other five countries have 0.06 per cent.

The finding of continent wise analysis shows that in the Asian continent, only seventeen countries contributed. Among the seventeen countries, Japan has secured first rank, India got second rank and last the rank is secured by of Philippines. Further the global level per cent of Asian countries has 3.43. Among the 3.43 per cent, Japan has 0.76 per cent, India has 0.52 per cent, and other fifteen countries have 2.14 per cent.

The result of continent wise analysis is that in the European continent, only twenty nine countries contributed. Among the twenty nine countries United Kingdom has the first rank, Netherland has the second rank, followed by France with the third rank, Germany with the fourth rank, Italy has fifth rank and Ukraine has last rank of publication. Additional
global level percentage of European countries has 42.24 per cent. Of the 42.24 per cent, United Kingdom has 21.48 per cent, Netherland has 5.41 per cent, France has 4.02 per cent, Germany has 2.77 per cent and other twenty five countries have 8.56 per cent.

The finding of continent wise analysis is that in the North American continent only four countries contributed. Among the four countries USA has the rank among the four countries and then Canada has the second rank, Mexico has the third, the fourth rank has been taken by Jamaica with only one publication. The global level percentage of North American countries is 51.08 per cent. Among the 51.08 per cent USA has 49.93 per cent and Canada, Mexico, Jamaica have 1.15 per cent each.


The result of South American Continent Vs year wise distribution on epidemiology study shows that six countries totally contributed. Brazil has highest publication years of 2010 and lowest publication year of 2000, 2001, 2002 respectively, Argentina has higher publication years of 2007, 2008 and lower years of 2000, 2002 with nil publications, followed by Chile has respectively greatest publication years of 2002, 2008 and lowest of 2001, 2005, 2009 and 2012, Colombia has most publication years of 2010 and lowest publication years of 1999 to 2006, Ecuador has highest publication year of 2004 and lowest year of 1999 to 2001, 2003 and 2005 to 2013, Venezuela has contribute only four years and remaining years nil publication.

The result of Oceania continent Vs year wise distribution in analysis reveals that totally two countries contributed. New Zealand has maximum publication year of 2005 and minimum publication year of 2012; Australia has greatest publication year of 2002 and lowest publication year of 1999.

The finding of African continent Vs year wise distribution shows that totally fourteen years six countries contributed. South Africa has large publication years of 1999, 2012 and nil publication years of 2009, 2011, Nigeria has highest publication years of 2010 to 2013 and nil publication year of 1999 to 2008 and 2013, followed by Ethiopia has publishing year of 2000 and remaining twelve years have nil publications, Egypt has only one publication year of 2013 and others nil publication. Kenya has only one publication year of 2000 and the remaining years have nil. Malawi has publication years of 2005, 2009, 2010 and other years have nil. Uganda has only one publication year of 2008 and the remaining years have nil publication.

The result of Asian continent Vs year wise publication in analysis shows that totally seventeen contributed. Japan has highest publication years of 2013 and lowest publication year of 2001, India has great publication year of 2008 and tiny publication year of 2001,
followed by South Korea has utmost publication year of 2010 and lowest year of 2007 has nil publication, China has maximum publication year of 2013, and minimum 2000 has nil publication, Iran has great publication year of 2012 and small publication year of 1999 to 2006, Russia has each one large publication years of 2005, 2009, 2011 and small publication year of 1999, 2000, and 2002, Turkey has maximum publication year of 2010 and 2001 to 2004 2006 and 2007 have nil publication.

Singapore has highest publication years of 2009 and 1999, 2000, 2003, 2011, and 2013 has nil publication. Saudi Arabia has greatest publication years of 2006 and 2008 has nil publication, United Arab Emirates has highest publication years of 2011 and 1999 to 2003 have nil publication, Pakistan has highest publication year of 2011 and 1999 to 2003, 2005, 2006, and 2009 has not any publication, Taiwan has maximum publication year of 2013, and 1999, 2000, 2002 to 2004, 2006, 2007, 2011 have nil publications.


The finding of the study European continent Vs year wise contribution of analysis reveals that totally 29 countries contributed. United Kingdom has higher publication year 2007 of and lower year of 1999, Netherland has high publication year of 2009 and low publication years of 1999 and 2002 respectively, France has higher publication year of 2000 and lower publication year of 2005, followed by Germany has maximum publication year of 2010 and minimum publication year of 2005, Italy has utmost publication year of 2010 and
least publication year of 1999, Switzerland has greatest publication year of 2010 and lowest publication year of 2003, Ireland has highest publication year of 2010 and lowest publication year of 2005, Norway has higher publication year of 1999 and 2011 to 2013 having nil publication years.

Austria has highest publication year of 2006 and 2000 has nil publication year, Denmark has greatest publication year of 2002 and 2005, 2007 to 2009, 2012 and 2013 are having nil publication years, Sweden has higher publication year of 2013 and 1999 to 2003 and 2006 to 2008 are having nil publication, Croatia has maximum publication year of 2006 and 2013 has nil publication, Poland has higher publication year of 2011 and 2000, 2001, 2003 and 2004 having nil publication, Belgium has respectively highest publication years of 2001, 2007, 2008 and lowest years of 1999 and 2004 respectively, Greece has utmost publication year of 2012 and nil publication years of 2002 and 2005, Czech Republic has maximum publication year of 2013 and nil publication years of 2000, 2006 and 2007, Hungary has highest publication each year of 2000, 2003 and 2013 and nil publication years of 2006 and 2011, Finland has higher publication year of 1999 and nil publication years of 2001, 2002, 2005, 2007, 2009 and 2011 to 2013.

Slovakia has only contributed for seven years and the remaining eight years there was no publication. Bosnia & Herzegovina have only four years of publication and the remaining eleven years nil publication, Romania has only four years of publication and the remaining eleven years nil publication, Lithuania has only four years of publication and the remaining eleven years nil publication, Portugal has only four publications years of 2004 and 2008 to 2010 and the remaining years nil publication, Iceland has only three years of publication and the remaining twelve years nil publication. Bulgaria has only two years of publications and other years have nil publication, Serbia and Yugoslavia have only one and other fourteen
years have nil publication, Ukraine has contributing in 2001 and other fourteen years have nil publication.

The result of North American continent Vs year wise output of analysis shows that totally four countries contributed USA has higher publication years of 2013 and lower publication year of 1999, Canada has high publication year of 2008 and low publication year of 2005 followed by Mexico has highest publication year of 2004 and lowest publication year of 2001 and final contributes of Jamaica has only publication year of 2000 and other years nil publication.

Relative growth rate of publication has shown more or less a similar trend. Consequently the mean doubling time for publications or national (India) wise research output has shown decreasing and increasing trend.

The findings of the relative growth rate of articles form of publications reveal the following facts. It is observed that the relative growth rate has shown an increasing and decreasing trend. Contrastingly, the doubling time for publication has also shown an increasing and decreasing trend in journal articles. The result shows the mean relative growth rate has increasing and decreasing and means doubling time has shown increasing trend.

It is observed from the result of analysis that the relative growth rate of meeting abstract form of literature has shown decreasing and increasing trends. Contrastingly, the doubling time of publication has shown increasing and decreasing trends and the mean relative growth rate and doubling time has revealed increasing and decreasing trend.

The result of the relative growth rate of review form of publication indicates the following facts. The relative growth rate of review form of publication has shown decreasing and increasing trend also revealed mean relative growth rate has decreasing trend. Moreover,
doubling time of publication has shown decreasing and increasing trend and the mean
doubling time has exposed decreasing trend.

It is observed from the result of analysis that the relative growth rate and doubling
time of editorial material form of literature has shown increasing and decreasing trend. Contrastingly, the mean relative growth rate and mean doubling time revealed increasing and decreasing trend.

The result of overall growth rate and Doubling Time of letter publications in
examines the following facts. Relative growth rate and doubling time of publication has
shown more of less a similar trend. Consequently the mean relative growth rate has
increasing trend and doubling time of publications has shown decreasing and increasing
trend.

The result of the relative growth rate of correction form of publication indicates the
following facts. The relative growth rate of correction form of publication has shown
decreasing and increasing trend also revealed mean relative growth rate has increasing and
decreasing trend. Moreover doubling time of publication has shown decreasing and
increasing trend and mean doubling time has shown increasing and decreasing trends.

The relative growth rate of book review form of literature has shown increasing and
decreasing trend. Consequently the doubling time of publication has shown increasing and
decreasing trend and the mean relative growth rate and doubling time has revealed increasing
trend.

The result of relative growth rate of new item form of publication indicates the
following facts. The relative growth rate of news item form of publication has shown
decreasing and increasing trend also revealed mean relative growth rate has increasing and
decreasing trend. Moreover doubling time of publication has shown decreasing and increasing trend and mean doubling time has exposed increasing and decreasing trend.

Activity index value of national and international output in the study period shows that only three years have lower activity index and the remaining twelve years have higher activity index. Higher activity index value means “the value is more than 1.0”, and under activity index value means “the value is less than 1.0”.

The result of activity index value of journal articles in the study period shows that of the totally fifteen years, there is no higher activity index. it means all years have below 1.0.

The finding of activity index values of meeting abstract reveals that only five years have higher activity index value: for the remaining ten years activity index value is less than 1.0.

The finding of activity index values of review shows that only one year has activity index value greater than 1.0; for the remaining fourteen years have under activity index value.

The result of activity index values of editorial materials shows that only one year has higher activity index value; the remaining fourteen year’s activity index value is less than 1.0.

The finding of activity index values of letter shows that only six years have activity index value greater than 1.0; the remaining nine years have below activity value.

The result of activity index values of correction reveal that only nine year’s have higher activity index value; the remaining six year’s activity index value is less than 1.0.

The finding of activity index values of book review shows that only seven years have higher activity index value: the remaining eight year’s activity index value is less than 1.0.
The result of activity index values of news item reveals that only three years have lower activity index value; the remaining thirteen year’s activity index value is higher than 1.0.

The finding of activity index and priority index value of South America continent shows that only thirteen year’s value is higher value; the remaining three year’s activity index value is less than 1.0 value.

The result of year wise activity index value of Oceania continent shows that in this study period 2000, 2001 and 2005 to 2013 have higher activity value; the remaining 1999, 2003 and 2004 activity index have lower than 1.0.

The finding of year wise activity index value of Africa continent reveals that all the years have higher activity index value except the years 2004, 2005 and 2011; its mean is lower than 1.0.

The finding of year wise activity index value of Asian continent reveals that in the study period only 2005 has under activity index; the remaining fourteen years have higher activity value; the higher activity means value is above than 1.0.

The result of activity index and priority index value of European continent shows that only two year’s value is higher value; the remaining thirteen years value is less than 1.0 value.

The finding of year wise activity index value of North America continent shows that all the years have under activity index value; it means lower than 1.0.

The result of author pattern Vs year wise distribution of epidemiology shows that in the study single author has highest publication year of 2008 and lowest publication year of 2013. Among the fifteen years double author’s has higher publication year of 2009 and lower publication year of 1999 and followed by three authors has great publication year of 2013 and
tiny publication year of 2001, four author’s distribution has greatest publication year of 2013 and lowest publication year of 2000, five authors have maximum publication year of 2012 and minimum publication year of 2000 and finally six and above authors have utmost publication year of 2013 and 1999 has least publication.

The authorship pattern of epidemiology shows the following facts; six and above authors have highest publications and five authors have least publications.

The finding of author productivity of epidemiology research revealed the following facts; single author has top most output, two authors has second highest output, followed by three author contributes third most output, four author contribute fourth greatest output, five authors contribute fifth place, six authors contributes six place of output, seven authors contribute seventh place, eight author contribute eighth place and remaining authors has gradually decreasing up to forty eight authors.

The author productivity according to the application of Lotka’s law revealed the following facts. It is observed that 86.59 per cent of the authors contributed only one papers and it was contrary to Lotka’s findings of single author contribution which was about 86 per cent of total publication in any given discipline. There by it invalidated the Lotka’s findings further the application Lotka’s chi-square model also confirmed this facts, Lotka’s chi-square confirmed the source trend. It explained the fact that the calculated $X^2$ value was 20425.38, thus the present analysis clearly invalidated the Lotka’s law findings.

The finding of authors according to their highest number of contributions reveals that “Mohan V” has published the highest number of publications (48 articles) in the field of epidemiology studies in Scientometric with first rank. “Orchard TJ” has published next highest (46 articles) with second rank. And “Boffetta P” has published with third rank (43 articles), “Cooper C” has published with fourth rank (41 articles), “Smith GD” has published
with fifth rank (36 articles) The findings of author highest contribution continent of Asian continent and his institution of Madras Diabetes Research Foundation & Dr Mohan’s Diabetes Specialties Centre, second highest author contribution continent of North America and his institution of University of Pittsburgh. Third author contributions continent of Europe and his institution of International Agency for Research on Cancer, Fourth author contribute continent of Europe and his institution of University of Southampton, Smith GD contribute continent of Europe and his institution of University of Bristol.

Finding of Bradford’s distribution does not fit for this study.

The degree of collaboration is reported more after the year 1999 of the taken study period. When the analysis is done for the degree of collaboration among the authors in producing research output for epidemiology, it is found that multi author productivity is more and shows an in increasing and decreasing trend during the study period. Based on this study, the result of degree of collaboration is = 0.80

The analysis of language wise publication of research output show that generally English is the medium of research communication as it is widely recognized all over the world. However, a few research papers have been published in other twelve languages.

Language Vs year wise publication output shows that English has highest output year of 2013 and lowest output year of 1999. French has greatest output year of 1999 and lowest output year of 2012. German has maximum output year of 2010 and minimum output year of 2009, Spanish has higher output year of 2010 and lower output year of 2001, Portuguese has respectively utmost output years of 2008 and 2009 and 2001 has nil output.

Pages contribution in epidemiology research shows that among the fifteen year pages, 2013 has got first rank with (14808 pages), 2012 has got second rank with (13753 pages),
2011 has got third rank with (13708 pages), 2010 has got fourth rank with (13541 pages), 2009 has got fifth rank (12177 pages) and 1999 has got sixth rank with (7607 pages).

The finding of publisher wise contribution of research performance shows that among the 1306, Lippincott Williams & Wilkins has first performance of output, Wiley-Blackwell has second high performance of output, Elsevier Science Bv has third performance of output, Springer has fourth performance, Elsevier Science Inc has fifth performance of output, and Oxford Univ Press has sixth performance of output, Elsevier Sci Ltd has seventh performance of output, Oxford University Press Inc has eighth research output.

Distribution of source published on articles reveals that among 2417 sources contributed, Journal of Clinical Microbiology has first place with 300, Clinical Infectious Diseases has second place with 151, Epidemiology and Infection has third place with 150, Plos One has fourth place with 142, American Journal of Tropical Medicine and Hygiene has fifth place with 117, Journal of Medical Virology has sixth place with 114 and Journal of Infectious Diseases has seventh place with 112. The researcher explained only seven highest published sources on articles and also revealed the same data applied for Bradford’s law of scattering. Therefore this result is fit for Bradford’s law of scattering.

Distribution of source published meeting abstract shows that totally 456 sources published 4530 output; among the 456, American Journal of Epidemiology has first rank with 207, Epidemiology has second rank with 142, Gastroenterology has third rank, International Journal of Infectious Diseases has fourth rank, International Journal of Antimicrobial Agents has fifth rank, Pediatric Research has sixth rank, Circulation has seventh rank, American Journal of Tropical Medicine and Hygiene has eighth rank, Phytopathology has ninth rank and Tropical Medicine & International Health has tenth rank. The researcher explained ten top publications of sources on meeting abstract.
Distribution of source published on review only shows that 3086 outputs were published by 1218 sources. Among the 1218 sources, Current Opinion in Infectious Diseases has first position with 42, Clinical Microbiology Reviews has second position with 37, Seminars in Respiratory and Critical Care Medicine has third position, Current Opinion in Rheumatology has fourth position, CNS Drugs has fifth position, Drugs & Aging has sixth position, Drugs has seventh position, and Deutsche Tierarztliche Wochenschrift has eighth position, 4 sources published have ninth position and 3 sources published tenth position.

Distribution of source published on editorial material reveals that among 581 sources, International Journal of Epidemiology has first place with 117, American Journal of Epidemiology has second place with 72, Epidemiology has third place with 67, Journal of Epidemiology and Community Health has fourth place, European Journal of Epidemiology has fifth place, and Revue D Epidemiologie Et De Sante Publique has sixth place of publication. The investigator explained only six places.

Distribution of source published letter only reveals that 619 outputs were published by 222 sources, Among the 222 sources, International Journal of Epidemiology has first rank with 32, American Journal of Epidemiology has second rank with 31, Lancet has third rank, Epidemiology has fourth rank, and Clinical Infectious Diseases, Journal of Clinical Microbiology and Journal of the National Cancer Institute have fifth rank.

Distribution of source published correction only shows that 234 outputs were published by 175 sources. Among the 175 sources, American Journal of Epidemiology has first place with 5, Emerging Infectious Diseases, European Journal of Epidemiology, Journal of Clinical Microbiology, Journal of Infectious Diseases and Lancet have second place with 4 and moreover Allergy, American Journal of Gastroenterology, British Medical Journal, Cancer Epidemiology Biomarkers & Prevention, Clinical Infectious Diseases, Clinical Microbiology Reviews, Epidemiology, Intensive Care Medicine, International Journal of
Epidemiology, JAIDS -Journal of Acquired Immune Deficiency Syndromes, Journal of Clinical Oncology and Pediatrics have third place with 3, and 16 sources have fourth place with 4, and 151 sources have fifth rank.

Distribution of source published on book review shows that among 94 sources, Public Health has first position with 14, European Journal of Public Health has second position Australian and New Zealand Journal of Public Health, Cadernos De Saude Publica, Gaceta Sanitaria and Journal of the Royal Statistical Society Series A-Statistics in Society have third position, American Journal of Psychiatry and British Journal of Psychiatry have fourth position, 12 sources have fifth position, 16 sources have sixth position and 62 sources have seventh.

Regarding news Item only, 113 outputs were published by 46 sources; among the 46 sources, science has first rank with 44, Epidemiologia & Prevenzione has second rank with 9, Veterinary Record third rank, Eurosurveillance and Nature have fourth rank, Chemistry & Industry has fifth rank, Chemical & Engineering News. Journal of Investigative Medicine, Lancet and Parasitology Today have sixth rank, and 36 sources have seventh rank.

Subject wise distribution shows that 132 subjects published 24097 outputs. Among the 132 subject’s Public Environmental Occupational Health has occupied first place with 3219, Infectious Disease has second place with 1693, Medicine General Internal has third place, Oncology has fourth place, Immunology has fifth place, Clinical Neurology Neuroscience has sixth place, Gastroenterology & Hepatology has seventh place, Microbiology has eighth place, Pediatrics has ninth place, and Endocrinology & Metabolism has tenth place, Acoustic, Radiology Nuclear Medicine, Anatomy & Morphology: Biology; Microscopy, Communication, Construction & Building Technology, Folklore, Geosciences, Multidiscipline Water Resource, Government & Law; Medical Ethics, Linguistics; Language
& Linguistics, Medical Informatics, Philosophy, Political Science, Religion, Sociology, Telecommunications, Theater and Woman Studies have only one output.

Regarding the priority index of South American continent’s country’s all the continents; the time period taken for the analysis in this study is fifteen years (1999 to 2013). The South American continent’s country shows that of fifteen years, only eight years have higher priority and the remaining seven years have lower priority. It means “1.0” higher value and lower less than “1.0”. In addition the study revealed specialization index value is 0.93.

The Oceania continent’s countries show that six years have higher priority and nine years have lower priority; moreover, the study revealed specialization index value is 1.10.

African continent’s countries show that seven years have higher priority and eight years have lower priority; moreover the study revealed specialization index value is 0.99.

Asian continent’s countries publications in epidemiology shows that seven years have higher priority and eight years have lower priority; moreover the study revealed specialization index value is 0.92.

European continent’s countries show that nine years have higher priority and six years have lower priority; moreover the study revealed specialization index value is 1.01.

North American continent’s countries show that eight years have higher priority and seven years have lower priority; moreover, the study revealed specialization index value is 1.00.

The source wise distribution of epidemiology research output by 6963 institutions contributing to epidemiology research. Among the 2986 sources, American Journal of Epidemiology has first place with 396, Journal of Clinical Microbiology has second place with 316, Epidemiology has third place, Clinical Infectious Diseases has fourth place,
International Journal of Epidemiology has fifth place, American Journal of Tropical Medicine and Hygiene has sixth place, International Journal of Infectious Diseases has seventh place, Epidemiology and Infection has eighth place, International Journal of Antimicrobial Agents has ninth place, Journal of Epidemiology and Community Health has tenth place and the least distributed 1004 sources have published one output each.

Institution wise distribution of research output shows that among the 6963 institutions Centre Disease Control & Prevent has the first highest output with 341, Harvard University has second highest output with 238, University Pittsburgh has third contribution, Mayo Clinic has fourth contribution, University Michigan has fifth contribution, Columbia University has sixth contribution, University North Carolina has seventh contribution, Johns Hopkins University has eighth contribution, National Cancer Institute has ninth contribution, and University of Washington has tenth contribution. The researcher explained only ten contributions in the finding of the study.

Suggestions

The researcher has suggested following measures to improve the epidemiology based on the findings of the present study.

1. Based on the findings the scientists may be encouraged to carry out more research activities in the ignored of epidemiology.
2. Among the continents North America, Europe and Asia dominate other continents in producing more number of research outputs in epidemiology. The environment and infrastructure of these continents are also very active for the complete growth of epidemiology research.
3. It needs to provoke and support researchers and scientists in the field of epidemiology to do research to discover the impact of research outputs.
4. The epidemiology scientists should be given adequate protection and precautions pertaining to professional hazards and external threat so that they can bestow their full attention to research.

5. The universities and other research institutions need to be provided with more financial support in the form of research grants and sophisticated equipment to increase the quality of research.

6. There is a need to identify the core area of research on epidemiology in scientometric.

7. The research output in scientometric studies is quite low in many of the countries in South America continent during the study period except Brazil and Argentina. Hence there is a need to increase research in epidemiology through government by promoting and providing financial assistance.

8. There is a need to encourage the Australian scholars to do research on epidemiology in scientometric, since their relative contribution is less than New Zealand’s scholars.

9. Some of the Asian continent’s countries have not done research in epidemiology studies in scientometric. Hence, India should motivate the researchers to do research in this area with a view to identify the impact of the study.

10. The conclusion of the present study suggests that the productivity of the author could be recognized to distribute more number of contributions instead of single contributions.

**Result of Hypotheses Testing**

1. The growth of literature in epidemiology research output is in increasing and decreasing trend tested through year wise distribution of the whole study period.”This hypothesis is proved as per the result of growth rate analysis”. 
2. There is a significant variation in the growth of research output on epidemiology research among the continents and countries. “This hypothesis is proved according the continents and countries analysis”.

3. The relative growth rate of total scientific publications is an increasing and the doubling time for publications reflects an increasing trend. “This hypothesis has been disproved according the analysis of relative growth rate and doubling time”

4. Among the six continents, there is no significant variation in epidemiology research output. “This hypothesis has been disproved according to continent wise analysis”.

5. The distribution of epidemiology journals and articles disputes the implication of Bradford’s Law

6. The implementation of Lotka’s law is related to author productivity in epidemiology research study.

7. Collaborative authors produce more number of papers compared with single authors. This hypothesis is proved according to the degree of collaboration research output in authorship pattern.

Conclusion

The result obtained shows that the articles produced in journal are found to be more when compared with other forms. It is inferred that the research productivity on epidemiology shows increasing and decreasing trends. The analysis of language wise shows that majority of papers are published in English. It is the medium of research communication as it is widely recognized all over the world. It is found that the mean growth rate and the mean doubling time is increasing and decreasing and also decreasing and increasing in research output of epidemiology. The North American continent stood at first rank in productivity on epidemiology followed by Europe at second rank and Asia at third rank.
The research output is analyzed for various countries from the six continents; it is found that the USA in North America, UK in Europe and Japan in Asia are dominating; the relationship between the zones is $1:a:n^2$, whereas it is observed that epidemiology journals report is $88:400:1929$. 74567 authors participated in the publication output of epidemiology.

The author-wise result shows that Mohan V (48 articles), Orchard TJ (46 articles), Boffetta P (43 articles), Cooper C (41 articles) are the highest participators of epidemiology. The result of degree of collaboration is ($=0.80$). From the scattering of journals used by Bradford’s law, it is found to be greater than Bradford’s expectation. Centre Disease Control and Prevent has more number of publications and stands at the first rank with 1.42 per cent.

Epidemiology is the study of the frequency, distribution and determinants of diseases and other health related conditions in human populations, and the application of this study to the promotion of health, and to the prevention and control of health problems (Yigzaw Kebede 2004). The present scenario there are many diseases spread out across the world. Now epidemiology research is very important to the entire people of the world. The present scientometric study helps to improve epidemiology research related documents in libraries. These documents may support people to know the distribution and determinants of diseases and other health related conditions in human populations.

**DIRECTIONS FOR FURTHER STUDY**

The present study on research output in epidemiology offers opportunity for further research in the following areas:
- The extent of collaborative research performance in subfield of epidemiology
- Mapping the literature of epidemiology research
- Collaborative research publications of epidemiology
- Research trends in epidemiology: Scientometric profile of Asian countries
- Trends in epidemiology related research articles in a medical journal