CHAPTER - V
CONCLUSION & SUGGESTIONS

5.1 Introduction

The past decade has witnessed the modern advances of high-throughput technology and rapid growth of research capacity in producing large-scale biological data, both of which were concomitant with an exponential growth of biomedical literature. This wealth of scholarly knowledge is of significant importance for researchers in making scientific discoveries and healthcare professionals in managing health-related matters. However, the acquisition of such information is becoming increasingly difficult due to its large volume and rapid growth. In response, the National Center for Biotechnology Information (NCBI) is continuously making changes to its PubMed Web service for improvement. Meanwhile, different entities have devoted themselves to developing Web tools for helping users quickly and efficiently search and retrieve relevant publications. These practices, together with maturity in the field of text mining, have led to an increase in the number and quality of various Web tools that provide comparable literature search service to PubMed.

5.2 Leprosy

Leprosy is a chronic, dermatological and neurological disease, results from infection with the uncultivable pathogen Mycobacterium leprae (Britton, Lockwood, 2004). The disease is curable yet remains a public health problem even though there is no known ubiquitous reservoir for transmission of M. leprae other than human beings. Thanks to the massive implementation in the 1980s of multidrug therapy (MDT) by the World Health Organization, over 14 million patients have been cured and the incidence of leprosy has declined considerably. Nonetheless, an average of 250,000-300,000 new cases have been reported annually during the last 5 years thought the world (Anon, 2010). Many of these cases occur in children, there by indication that the chain of transmission remains, albeit weakened; this highlights the need for sensitive and reliable epidemiological methods to detect M.leprae and to monitor its spread both locally and globally. Genome sequencing has proved a particularly powerful means of understanding the biology and genetics of the leprosy bacillus, and comparative genomics has
uncovered polymorphisms that can serve as the basis for developing molecular epidemiological tools. Such tools have started to find application and are helping us to understand how M. leprae has evolved.

5.3 Bibliometrics

Bibliometrics has been defined as “the quantitative analysis of the characteristics behavior and productivity of all aspects of written communication, library staff and information users” the word Bibliometrics was introduced by Pritchard in 1969 which substituted the earlier term “Statistical Bibliometrics” which was used for the same concept. Various techniques of Bibliometrics analysis help to determine special trends in literature of given field study. It is now popular among library professionals and researchers. Bibliometrics studies are helpful in evaluating library services, collecting development, policy refinement, decision making and resource allocation and even weeding. Data produced by Bibliometrics methods provides a scientific basis to library administrator for decision making. Bibliometrics has been considered useful for curriculum analysis and appraisal of research output quality. (Mahapatra) Bibliometric has become a standard tool of science policy and research management in the past decade. All significant complains of science indicators to a large extent rely on publication and citation statistics and other Bibliometric techniques (Kumar 1998). Bibliometric is concern with the application of mathematical and statistical is major sub discipline of quantitative research. This is a tool traditionally used by the library and information science professional for studying the communication process, information flow and professional for better understanding and effective management and dissemination of information.

Bibliometric as an interdisciplinary subject, takes on an auxiliary or instrumental role in measuring the different fields that make up its general branch of science that is discipline integrating the curriculum of library and information science. These subject act like links of a chain in that, should one of them fail, the other could hardly function together in a satisfaction way. For example . Bibliometric collaborates regularly with the field of information sources, in order to detect lacunae in Bibliometric collection, maintain the collection and facilities corrections and the occasional removal of objectionable materials. Moreover its analysis rely on descriptive fields of primary documents that have been developed
by the area of documentary analysis: cataloguing, classification or indexation. When unable to find a given document due to increasing quantity of them— it has resource to bibliography and information sources either printed or mechanized in order to obtain the necessary documents needed to analyze a given topic or its researcher.

Recent developments in the methods of library and information science have contributed significantly to the consolidating of Bibliometric. In turn the latter has also played an important role in the exposure and application of information science thus establishing a symbiosis between the two sciences.

5.4 Finding of the Study

The findings of Bibliometrics study in PubMed on Leprosy are as follows.

5.4.1 Contribution of Research Articles year wise analysis

The distribution of research articles on Leprosy by year and months indexed in Pubmed from 2003-2012. It is clear that the number of research articles has been increased over the months. It is indicates also that of the 6981 articles published in 2012. i.e. (12.61%) has the height number. While in the other years (87.39%) the lowest number. This confirms, "Every year literature on leprosy is increasing" (Hypothesis no. 1) is valid. (Table No. 4.1)

5.4.2 Distribution of articles by Subject

Publications by Subjects have substantially increased during the period under study. The total number of papers increased from 3257 during 2003 to 2007 to almost two times, i.e. 3727 during 2008 to 2012, most of the increase being during the last five years. (Table 4.2)

5.4.3 Authorship Pattern year wise

It is clear that the 153 articles written by single author and it is the highest number published in PubMed 2004. It indicates also that 60 articles written by single author published in PubMed 2012. It is the lowest number. The number of research articles has been published in PubMed written by two authors i.e. 114 (2012) it is the highest number and 58 articles published in 2009 with lowest number. It indicate that in 2012, 120 research articles are published written by
three authors as well as 71 research articles are published in 2007 and those are
lowest number. Table No.4.2 shows the distribution of research in year 2012. It is
the lowest number in the average of ten years 2003 to 2012. 112 articles written by
four authors published in 2012 i.e. highest number. More than four authors
contributed 282 research articles in the year 2006. It is the lowest contribution in
the year 2003 to 2012. In the year 2012, 442 research articles contribution by more
than four authors. It is the highest number is the ten years rank. 3378 research
articles are contributed by more than four authors. (Table No. 4.3)

5.4.4 Relative Growth Rate and Doubling Time for publication

The Relative Growth Rate \([R (P)]\) and Doubling Time \([Dt (P)]\) of
Publication in Table No.4.3. It can noticed that the Relative Growth Rate of
Publication\([R(P)]\) lightly decrease from the rate of 0.7611 in 2003 to 0.1347 in
2012. The mean relative growth (i.e. 2003 to 2017) showed a growth rate of 0.4065
and (2008 to 2012) 0.1527. The corresponding Doubling Time for different years
\([Dt (P)]\) highly increased from 0.9105 in 2004 to 5.1433 in 2012. Thus as the rate
of growth of publication was decreased, the corresponding Doubling Time was
increased. This confirms, "Every year literature on leprosy is increasing"
(Hypothesis no. 1) is valid. (Table No. 4.4)

5.4.5 Degree of Collaboration

The year wise degree of collaboration which is falls between 0.88 and 0.87
with an average of 9.44 during the study period. This confirms, “Research in
leprosy is highly collaborative” (hypothesis no. 2) is valid. (Table No. 4.5)

5.4.6 Degree of Collaboration among different category of authors

The degree of collaboration among two authors publication 0.15 is the
highest and lest was 0.09. In three authors collaboration 0.16 is highest least 0.12
in four authors collaboration 0.15 was highest and least was 0.11 whereas more
than four authors’ collaboration 0.52 was highest and least was 0.36. It was noticed
that 0.52 was highest among the collaboration in different category of authors. This
confirms, “Research in leprosy is highly collaborative” (hypothesis no. 2) is
valid. (Table No. 4.6)
5.4.7 **Authors Productivity**

The average author per paper for the period 2003-2012 is 3.48 and productivity per author mentioned as 0.48.

The above table shows that the data pertaining to author productivity and average author per year. The highest no. of productivity per author is 0.26 and lowest no of author is found 0.20. In the case of Average Author Per Paper the highest no. was found that 5.05 and lowest number was found 3.83. (Table No. 4.7)

5.4.8 **Ranking of Publication Title**

The study reveals that “Leprosy Review” score the first rank which account to 653 (9.35%) of the total papers. The “Indian Journal of leprosy” scored second rank with 349 (i.e.5%) papers and “Japanese Journal of leprosy” 207 (i.e.2.97%) scored third rank in the rank list. (Table No. 4.8)

5.4.9 **Country of publication**

United States with 1191 (17.06) on first rank, followed by United Kingdom 1128 (16.16%) and India 930 (13.32%). (Table No. 4.9)

5.4.10 **Rank list of authors (First author)**

In overall journals there were 6981 papers written by 31411 authors appearing at first position. The average numbers of papers per author were 22.22%. Ghosh, Sudip kumar was found most prolific first author with 41 papers contributed to the subject under study. Matsuoka, Masanori was found second prolific author with contribution of 33 papers, followed by Lockwood, Diana NJ. with 29 papers respectively. (Table No. 4.10)

5.4.11 **Ranking of authors (at any posotion)**

In overall data Sarno, Euzenir Nunes was found most prolific author with 135 papers contributed to the subject under study. Ishii, Norihisa. was found second prolific author with contribution of 132 papers, followed by Katoch, Vishwa Mohan with 124 papers respectively. (Table No. 4.11)
5.4.12 Bradford’ Curve for overall data

The data set of overall data graphically fits into the Bradford’s law of scattering. (Table No. 4.12)

5.4.13 Applicability of Price’s Square Root Law and 80/20 Rules

It can be observed that, percentage of papers published in proportions to the square root of total author is 13.29 which is much below 50% as predicted by De Solla Price.

Similarly it is observed that 20% of the authors contributed maximum of only 48.40% of the total papers. This is much below the 80% as predicted by 80/20 rule.

Hence neither Price Square Root Law nor does 80/20 rule fit in to the present set of data. (Table No. 4.12.6.1)

5.4.14 Rank list of Institutions

It can be observed that, first rank maximum 52 (0.74%) Institutions were from the Leprosy Research Centre, national Institute of Infoectious Diseases, Tokyo, Japan. Followed by second rank National JALMA Institute for Lepeosy and other mycobacterial Disease (ICMR) Tajganj Agra 282001, India.43(0.62%). Followed by third rank Center for research and Training in skin Disease and Leprosy, Tehrean University of Medical Sciences, Teheran , Iran. 38 (0.54%). "Authors affiliated to academic institutions contributes maximum" (hypothesis no. 3) is valid. (Table No. 4.13)

5.4.15 Country wise authorship

It can be observed that, India ranked first with 1230 (17.62%) followed by Brazil with 547 (7.84%) and followed by Japan with 416 (5.96%) institutions country. (Table No. 4.14)

5.4.16 Publication concentration

In the present study communication channels were journal articles. If every volume treated as a separate channel, there were 1185 such communication channels. It can be observed from table that, 50% of the papers i.e. 592 accounted by jouranls. Hence the publication concentration is $0.499578$. (Table No. 4.15)
5.4.17 Language wise distribution

It shown that the journal published in English language at the top stage i.e. 6406 (85.36%), while at the second stage is Japanese with 348 (i.e.4.64%), There are article is published in French 205 (i.e.2.73%), after that Portuguese is 169 (2.25%) and Spanish languages with i.e.1.59% and 119 articles published. (Table No. 4.16)

5.5 Suggestions

PubMed is a government-sponsored system and is freely accessible by anyone who can access the Internet; they have limited free access to full-text journals. Although PubMed links to the full-text of many articles, it does NOT contain or search the full-text of journal articles. The search of full-text of journal articles should be made available for the users.

5.6 Further Area of Research

The following topics can be considered for the further studies

2. Trends in MERS Research.
4. Mapping of H1N1 Research.
5. Mapping of Cholera Research.
6. Online databases like MEDLINE, SCOPUS etc. can also be taken for study.