5

CONSPECTUS
5.1. Preamble

The present study aimed at analyses of quantitative and qualitative similarities between traditional citation pattern (ISI Web of Science and Scopus) and citations taken from Web (Google Scholar) of articles of open access ISI-indexed select journals from General and Internal Medicine which published in the year 2007.

The specific objectives include, to compares the citation counts of chosen databases, to study the correlation between traditional citation patterns with citations taken from the Web, to assess the citation overlap between the databases, the unique citations and to study the characteristics of citing documents.

Based on well-defined objectives, an appropriate methodology was adopted and carried out this study. The findings have been arrived based on analysis. In this Chapter, the summary of findings, conclusion, suggestions and area for further research are given.

5.2. Summary of Findings

5.2.1. Quantification of Citation Counts

1. The total number of citations from three studied databases that cited 2,082 research articles appeared in 23 General and Internal Medicine open access ISI-indexed journals published in 2007 is 62,900.

2. The number of citations count in Google Scholar was 28,040 (45%) against 19,015 (30%) in Scopus and 15,845 (25%) in ISI Web of Science.
3. The mean and median of *Google Scholar* is much higher than the *ISI Web of Science* and *Scopus* in General and Internal Medicine.

4. The citation mean and median of *ISI Web of Science* citations is lower than the *Scopus*.

5.2.2. Relationship between Traditional Citation Patterns and Citations taken from the Web

5. There is a significant association between the *ISI Web of Science* and *Scopus* citations and *Google Scholar* citations to open access scholarly journals in Medicine.

6. A significant correlation between *ISI Web of Science* citations count and *Google Scholar* citations count (r= 0.804**, P = 0.01) is seen.

7. There is also a significant correlation between the *Scopus* and *Google Scholar* citations count in the studied journals (r=0.840**, p = 0.01).

8. There is relatively stronger relationship between *Google Scholar* and *Scopus* citations than *ISI Web of Science* and *Google Scholar* citations.

9. The correlation between *Scopus* and *ISI Web of Science* citations (r=0.856**, p = 0.01) are relatively higher than between *Google Scholar* citations and both *ISI Web of Science* and *Scopus* citations.

10. In the case of individual journal, there is a significant correlation between *ISI Web of Science* and *Google Scholar* citations count and between *Google Scholar* and *Scopus* except some cases.

11. There is relatively high correlation between *ISI Web of Science* citations average and *Google Scholar* citations average (r=0.941**, p = 0.01) for select
open access Medical journals than between *Scopus* and *Google Scholar* citations average (r=0. 925**, p = 0.01).

12. There are significant correlations between Journal Impact Factor average and *Google Scholar* citations average (r = 0.714**), *Scopus* citations average (r = 0.709**) and *ISI Web of Science* citations average (r = 0.710**).

**5.2.3. Comparison of Traditional Citation Sources with Web Citation Source**

13. Out of 28,040 citations, 7,061 documents from *Google Scholar* found to be overlapped with *ISI Web of Science* and 20,979 (48%) unique citations occurred from *Google Scholar* out of 28,040 citations.

14. Of 15,845 citing documents from *ISI Web of Science*, 8,784 (20%) citations are found as unique citations which do not overlapped with *Google Scholar* citations.

15. There are 18,655 unique citations from *Google Scholar* (those not overlapped with *Scopus* citations) against 28,040 *Google Scholar* citations. 9,385 (40%) of the citations could be tracked in both databases (*Google Scholar* and *Scopus*).

16. It is also found that out of all 19,015 *Scopus* citations to studied articles, 9,630 (20%) are not overlapped with *Google Scholar* citations.

17. Out of 15,845 *ISI Web of Science* citations, 6,973 (20%) records are not found in the *Scopus* search results. Amongst 19,015 citations, 10,143 (29%) citations are not overlapped within the *ISI Web of Science* citations.

18. The overlap percentage between *ISI Web of Science* and *Scopus* has been found 51%.
19. Amongst 62,900 citations received, 19,230 (31%) are tracked in all the three databases.

20. A high degree of overlap is found between Google Scholar and Scopus (40%), followed by between Scopus and ISI Web of Science (39%) and between ISI Web of Science and Google Scholar (33%).

21. In studied journals, 36% (10,036) citations from Google Scholar overlapped with either Scopus or ISI Web of Science or both indexes.

5.2.4. Unique Citations

22. The unique citations returned in the Google Scholar that are not covered in the other two indexes are 18,004 citations. However, it should be noted that 480 (2%) of arrived documents are duplicates. Thus, 17,524 unique citations arrived from Google Scholar.

23. While analysing 15,845 citations from ISI Web of Science, 9,523 (60%) of citations are tracked in other two databases (Google Scholar and Scopus).

24. After deleting 1,096 (7%) duplicate records, 5,226 citations are found as unique citations from ISI Web of Science which did not occur within the Google scholar and Scopus.

25. Out of 19,015 citations from Scopus 11,847 (62%) of citations are duplicated in both Google Scholar and ISI Web of Science. Thus, Scopus received 6,159 unique citations.
5.2.5. Characteristics of Unique Citations

26. The qualitative analysis of Google Scholar unique citations revealed that the majority of them (93%) came from journals articles followed by theses (3%) and books (2%).

27. About 24% of the Google Scholar unique citations targeting the studied articles in the select Medical journals were from non-English Web documents.

28. Analysis of non-English Google Scholar unique citations indicates high percentage of Chinese language (1,884) citations. Spanish (588) and French (376) languages are occupied second and third positions respectively. Other oriental languages such as Japanese, Korean and Vietnamese also have their berth.

29. About 19% of the Google Scholar unique citations that targeting studied articles were published during 2007-2008 (two years after publishing of citing articles).

30. The different types of publications of unique citations from ISI Web of Science are Journal papers (3952), Review (738), Editorial material (178), Letter (152), Proceeding papers (86), Corrections (15), Meeting abstract (10), News item (8), Reprint (3), Book review (2) and other items (82).

31. The language of unique citing documents from ISI Web of Science is mostly English (93%).

32. The non-English languages citations fell into seventeen different languages. Amongst, Spanish, French were occupied first and second positions respectively. There were non-Roman scripts languages in the list. However, Roman script languages are dominants.
33. The studied open access articles in Medicine received a relatively higher percentage of unique citations from *ISI Web of Science* during 2009-2011.

34. The dominant types of the unique citing documents from *Scopus* that targeting studied articles were journal articles (5,913), serials (212) and conference proceedings (34).

35. Again, English language occupied major portion (79%) of the total *Scopus* unique citing documents.

36. Amongst non-English languages items, Spanish (288 documents) occupied a top position in the 19 items list. Chinese (223) and French (196) occupied second and third positions respectively. Here also, the Roman script languages are dominant.

37. About 18% of unique cited documents from *Scopus* are published two years after publishing of citing articles (during 2007-2008).

38. *Scopus* has included more numbers of journal articles than *Google Scholar* and *ISI Web of Science*.

39. Amongst three studied databases, *ISI Web of Science* received high proportion of citations from non-journal article documents (24%).

40. The studied open access ISI-indexed articles in Medicine received more citations from journal articles in *Google Scholar* (93%) than in *ISI Web of Science* (76%).

41. The language of the majority of unique citing documents from three databases was English (*Google Scholar* 76%, *Scopus* 79% and *ISI Web of Science* 93%).

42. *Google Scholar* received a great proportion of non-English documents (24%) than the two other databases.
43. About 45% of non-English unique citations from Google Scholar were from Chinese language documents. In contrast, in Scopus 17% and in ISI Web of Science 1% only were identified.

44. Analysis of languages of non-English unique citations from three databases indicated that 88% of unique ISI Web of Science citations, 71% of Scopus unique citations and 47% of Google Scholar unique citations were from Roman scripts languages.

45. There is relatively low percentage of non-Roman scripts languages unique citations from three studied databases.

46. The open access journal articles received nearly equal percentage of unique citations from three studied databases during the same period of time (2007-2012).

5.3. Conclusion

From the study, it is understand that Google Scholar received more citations than conventional citation databases (Scopus and ISI Web of Science) and the relationship between traditional citation databases and Web citation database are significant. Although the significant correlation between the Web-based citations (Google Scholar) and conventional citations (ISI Web of Science and Scopus) of open access scholarly journals in Medicine it indicating the potentiality of Web-based citations pattern to be used for impact assessment. Thus, it has valid reasons to use citation statistic derived from Google Scholar for impact calculations, when ISI Web of Science or Scopus citation data is not available for Medical research.
A significant citation overlapping between conventional citation databases and *Google Scholar* database indicate that three databases can be seen as complementary. Hence, the *Google Scholar* can be consider as a quality source for citation retrieval/tracking.

The results of qualitative analysis of unique citations show that characteristics of citing documents are different between *Google Scholar*, *ISI Web of Science* and *Scopus*. However, open access scholarly publishing is dominated by Journal articles and English language in the studied disciplines. Based on the results, we can have a better understanding of the common characteristics of *Google Scholar* unique citations in Medicine. This can, in practice, be used for design and development of Web-based scientific data-mining tools like autonomous or automatic Web-based citation indexes. Therefore, exploring the characteristics of scholarly communication on the Web may shed light on how citations that are only found online may be used to measure Web impact of the scientific works (i.e., journal articles, conference papers, dissertations, research reports) whose impact was previously impossible to assess through traditional citation indexes like *ISI Web of Science* and *Scopus* databases.

### 5.4. Suggestions

The process of data collection and analysis of the current research work have led to suggest the following:

1. Web citations (citations extracted from *Google Scholar*) as an alternative biblimoteric tool to *ISI Web of Science* or *Scopus* citation
databases, can be used for citations tracking and research evaluation in Medicine.

2. The policy makers and experts can use Web citations as an alternative indicator to *ISI Web of Science* or *Scopus* citations to evaluate universities, researchers, projects, disciplines and nations.

3. Lack of non-Roman language items on the Web causes the poor coverage of these sources in *Google Scholar*, warrant for the development of non-Roman language databases on the Web in Medicine for tracking and assessment of citations from non-Roman language documents.

4. The Medical Science articles need to be available more online to increase their citation impact.

### 5.5. Areas for Further Research

1. The present research is based on the OA ISI-Indexed journals extracted from *ISI Web of Science, Scopus* and *Google Scholar*. Similar studies can be made with the inclusion of non-OA journal publications.

2. A study can be conducted to compare traditional and Web-based citation pattern across multiple disciplines in Medical Science.

3. Similar studies can be undertaken to extract more Web citations in Medicine based on the Web/URL citation method and compare with traditional citations databases.