



## The Most Frequently Cited 100 Articles in Liver Transplantation Literature

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### ABSTRACT

**Introduction.** We investigated the liver transplantation literature since 1975 and found the most frequently cited 100 articles and assessed the distribution of authors and journals of these articles.

**Method.** Using the advanced mode of the Institute for Scientific Information (ISI) Web of Science (WOS) search engine, the words “SU = transplantation AND TI = liver OR SU = transplantation AND TS = liver” were used to scan articles and determine the most-cited 100 articles on July 18, 2016.

**Results.** From 1975 to date, it appears a total of 43,369 articles were published in the field of liver transplantation in the WOS. Although the most cited article had 677 citations, the least cited article had 180 citations. The mean citation number for the 100 articles was  $252.31 \pm 96.75$ . The mean annual citation number for the articles varied from 61.55 to 5 and the mean was  $15.31 \pm 8.63$ . The most cited article was by Feng et al “Characteristics Associated With Liver Graft Failure: The Concept of a Donor Risk Index” published in the *American Journal of Transplantation* (677 citations).

**Conclusion.** Bibliometric analysis highlights the key topics and publications that have shaped the understanding and management of liver transplantation. According to our research, this is the first study to investigate articles with most citations in the field of liver transplantation. In our study the article with the most citations was cited 677 times, whereas the 100th article was cited 180 times with a mean citation number for the 100 articles of  $252.31 \pm 96.75$ .

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**W**HEN one scientific article indicates another scientific article as a reference, this is called citing the article. While mentioning the scientific studies constituting the basis for the scientific study in the introduction, the original publications are cited. The number of citations of a scientific article indicates the impact of the article. For scientific articles the most common marker to assess a journal are the number of citations and markers based on this. Journals publishing scientific articles with many citations and with higher impact values (IV) are accepted as better qualified, although there are limits to this marker. As a result, newer objective criteria have been evaluated for assessment of scientific studies, journals, and scientists. A higher number of citations is important for assessment of the academic life of individuals and for advancement [1,2].

The Institute for Scientific Information Web of Knowledge (including Science Citation Index Expanded), produced by the Institute for Scientific Information (ISI), is well known as the world's leading citation database, and it can provide academic citation indexing and search service.

According to our research, there is no study from recent years investigating the number of citations of international articles in the field of liver transplantation.

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This study aimed to use the ISI Web of Science (WOS) search engine [3] to investigate the 100 international articles cited most frequently in the field of liver transplantation, to examine these articles in terms of authors and countries, and to research the publication journals.

## MATERIALS AND METHODS

Our study is a retrospective observational study. It was completed after receiving permission from Dokuz Eylül University non-interventional ethics committee (decision no. 2015/19-08).

Using the advanced mode of the ISI WOS search engine, the words “SU = transplantation AND TI = liver OR SU = transplantation AND TS = liver” were used to scan articles published from 1975 to date in the area of liver transplantation and determine the most-cited 100 articles on July 18, 2016 [3]. The study type was determined as randomized controlled study, prospective study, retrospective study, experimental study, letter to the editor, or case report. Articles with authors listed as the first author on more than one article, organizations with more than one entry, and journals with the most citations were taken from the list. The country, department, and organization of the first authors were determined from communication information. The relationship of the study to liver transplantation was determined according to the following criteria: related to liver transplantation surgery, immunology, pathology, or epidemiology, and assessed separately by two experienced liver transplantation surgeons. Articles that did not abide by these criteria were excluded. A list of the top 100 articles was made. On the list authors who were first author were checked one-by-one to see if they were listed as authors in other articles on the list. Accordingly a table was made listing first-named authors for the top 100 articles in terms of how many times their names appeared on the list from higher to lower (Table 1). Similarly tables were constructed based on organizations and journals listed at least twice in the list (Tables 2 and 3).

### Statistical Analysis

The statistical investigation of the data obtained in the research was analyzed using SPSS 15.0 (Statistical Package for Social Sciences, Chicago, Ill, United States). Frequency data are given as number (n) and percentage (%), whereas continuous values are given as mean  $\pm$  standard deviation. For statistical analysis the Mann-Whitney *U* test, Kruskal-Wallis test, and *t* test were used. A *P* value  $<.05$  was accepted as a significant difference.

## RESULTS

From 1975 to the present day, it appears a total of 43,369 articles were published in the field of liver transplantation in the WOS. The article with the most citations had 677 citations, whereas the article with the least citations had 180. The mean citation for the 100 articles was  $252.31 \pm 96.75$ .

The mean annual citation number for the articles varied from 61.55 to 5 and the mean was  $15.31 \pm 8.63$ . The most-cited article was by Feng et al “Characteristics Associated With Liver Graft Failure: The Concept of a Donor Risk Index” published in the *American Journal of Transplantation* (677 citations). The second most-cited article was by Ploeg et al “Risk-Factors For Primary Dysfunction After Liver-Transplantation - A Multivariate-Analysis” published in

*Transplantation* (668 citations) The third most-cited article was by Clavien et al “Preservation and Reperfusion Injuries In Liver Allografts - An Overview and Synthesis of Current Studies” published in *Transplantation* (666 citations).

When the authors listed as first names on the articles were assessed, Marcos A appeared 5 times as the first name, Gonwa TA had four articles, Yao FY had three article, Freeman RB had two articles, Krowka MJ had two articles, Rayes N had two articles, Suzuki S had two articles, Wachs ME had two articles, and Wiesner RH had two articles. The other authors on the list were first names on one article.

The three journals that appeared most frequently in the top 100 were *Transplantation* (n = 54), *Liver Transplantation* (n = 25), and *American Journal of Transplantation* (n = 13). Of the journals in the top 100, 87% were listed in the Science Citation Index (SCI) and 13% were listed in the Science Citation Index - Expanded (SCI-E). The top three countries listed as communication addresses for authors were USA (n = 76), Germany (n = 10), and Japan (n = 4). Of the authors, 82% listed addresses on the continent of Europe and 18% listed addresses outside the continent of Europe.

When the year of publication was assessed, the greatest number of articles in the top 100 most-cited articles were 37 articles published from 2000–2004, with 20 from 1995–1999, and 14 published in each interval from 1990–1994 and 2005–2009.

When the branch listed for the first authors was evaluated, 69% of authors were in surgical branches and 31% were in nonsurgical branches.

When the type of study was assessed, 42 were prospective, 25 were retrospective, 13 were reviews, 8 were experimental, 5 were case series, 3 were meta-analysis, 2 were guidelines with 1 in vitro study, and 1 was a study designed as both prospective and retrospective.

When the total number of citations and mean annual number of citations for the studies listed in the top 100 most-cited studies in the field of transplantation were analyzed according to year, there was a significant difference in the annual number of citations according to year ( $P < .001$ ). When the annual citation numbers for journals in the SCI and those in the SCI-E indices were assessed, interestingly, the mean annual number of citations for studies published in SCI-E journals was found to be significantly higher than those published in SCI journals ( $P < .001$ ).

There was no significant correlation found between the continent and country of authors and the total number of citations and mean annual number of citations.

When the text type of studies was investigated, there was a significant difference in mean total number of citations and mean annual number of citations ( $P < .05$ ).

When the branches of first authors in the articles included in our study were investigated from the communication address, there was no significant difference in total number of citations and annual number of citations found.

When the scientific articles included in our study were investigated in terms of journal, there was a significant difference in terms of mean annual number of citations ( $P < .001$ ).

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