



Ten-year analysis of hepatitis-related papers in the Middle East: a web of science-based scientometric study

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ABSTRACT

Background/Aims: In the Middle East (ME), the proper understanding of hepatitis, especially viral hepatitis, is considered to be extremely important. However, no published paper has investigated the status of hepatitis-related research in the ME. A scientometric analysis based on the Web of Science database was conducted on hepatitis-related papers in the ME to determine the current status of research on this topic.

Materials and Methods: A scientometric analysis using the Web of Science database, specifically articles from the Expanded Science Citation Index and Social Sciences Citation Index, was conducted on work published between 2005 and 2014 using the keyword "hepatitis" in conjunction with the names of countries in the ME.

Results: Of 103,096 papers that used the word "hepatitis" in their title, abstract, or keywords, only 6,540 papers (6.34%) were associated with countries in the ME. Turkey, Iran, Egypt, Israel, and Saudi Arabia were the top five countries in which hepatitis-related papers were published. Most papers on hepatitis A, B, and D and autoimmune hepatitis were published in Turkey, and most papers on hepatitis C were published in Egypt.

Conclusion: We believe that both the quantity and the quality of hepatitis-related papers in this region should be improved. Implementing multicenter and international research projects, holding conferences and congress meetings, conducting educational workshops, and establishing high-quality medical research journals in the region will help countries in the ME address this issue effectively.

Keywords: Hepatitis, Middle East, paper, prevalence, scientometrics

INTRODUCTION

The Middle East (ME) includes countries with varying levels of economic prosperity and differences in both population demographics and health status. The countries in the ME include Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Syrian Arab Republic, Turkey, the United Arab Emirates, and Yemen. The majority of people in this region are young and educated and live in middle-income countries (1-3). Of more than 10 million medicine-related papers published between 1996 and 2014, only 394,000 papers were published in the ME (4), which illustrates the low level of medical research in this region.

Different types of hepatitis have been reported in the countries of the ME and, despite the low number of

medical research contributions in general, many articles from this region have addressed hepatitis. Viral hepatitis is the type of most concern in the ME. Regarding the importance of forms of hepatitis in general, both hepatitis B and C infections are known to be significant causes of hepatocellular carcinoma (5). Approximately 500,000 to 700,000 people die annually from hepatitis B virus (HBV) infections alone (6), and these infections are an important health concern in the ME region (7). The ME is considered to be a region with intermediate to high endemicity of chronic HBV infections (2).

The hepatitis C virus (HCV) has infected approximately 130 - 150 million people worldwide and is also a major problem in the ME region (8). It has been reported that other regions such as Southeast Asia have a higher prev-

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alence of this type of infection and the rates vary across the ME (6, 8). The prevalence of HCV infections in Iran and Israel is about 0.5% (9) and 1.96% (10), respectively. Lebanon has a prevalence of HCV viremia of 4.2% (11), and the rate of HCV infections in Egypt is approximately 15-20% (12). Approximately 32% of hemodialysis patients in countries within the purview of the Eastern Mediterranean Regional Office of the World Health Organization (WHO) have acquired HCV infections (13). Furthermore, other countries neighboring the ME such as Pakistan and Azerbaijan have a considerable rate of HCV infections (11, 14), and these rates can directly influence those within the ME region.

Hepatitis A virus (HAV) infections usually occur asymptotically in childhood and symptomatically in adults. The global rate of new HAV infections is approximately 1.4 million cases per year (6). However, despite its prevalence across the world, updated data about HAV infections in the ME, including their burdens and seroprevalence, are limited. It has been reported that a slow shift in the age of infected subjects from childhood to adulthood has been observed (14). The hepatitis D virus (HDV) appears to be endemic in the ME region (15), and the hepatitis E virus is reported to have a prevalence ranging from 2.0% to 37.5% in countries of the ME and North Africa (16). Furthermore, other types of hepatitis, including non-viral (autoimmune and drug-induced) hepatitis, have been reported in the region of the ME (17,18).

Objective

To the best of our knowledge, no published paper has investigated the general status of hepatitis-related research conducted in the ME region. We believe that a scientometric analysis of hepatitis-related papers published on work carried out in the region can help to determine the situation regarding this issue, and we hope that it can serve as a road map for research centers and healthcare providers in this region to plan future research projects on hepatitis.

MATERIALS AND METHODS

Study Type and Data Source

This study was a scientometric analysis based on the Web of Science (WOS), which is one of the most important databases for scientific papers. For this analysis, the Science Citation Index Expanded and Social Sciences Citation Index were selected. All document types were included in this analysis. In addition, the 2014 impact factor of journals was retrieved from Journal Citation Reports for further analysis of the results (19). For the calculation of citations for authors and countries, we had to select only one citation database. In other words, we were unable to gather data from several databases. Therefore, we selected the WOS database as one of the most important in this field.

Time Span and Language

To analyze papers covering a period of ten years and on the basis of the initial WOS analysis, the time span was limited to the period between January 2005 and December 2014. However,

for citation analysis and calculation of the h-index, all citations within this timeframe, including 2015 and 2016, were considered. Our last search was performed on November 28, 2015. No language limitation was imposed.

Search Strategy

A hepatitis-related paper was defined as any paper with the word "hepatitis" in its title, abstract, or keywords. Articles were located using the keyword "hepatitis" together with the wildcard asterisk (*) and the field tag for "Topic" (TS). This field tag allowed us to search for the topic within titles, abstracts, keywords, and other indexing fields such as taxonomic terms and descriptors.

The countries in the ME region that were searched included Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Syrian Arab Republic, Turkey, the United Arab Emirates, and Yemen. Most were searched simply by using the full name of each country as a keyword. However, "Syria" and "Emirates" were used as search terms instead of the complete names of these countries, as these names generated no results. All these keywords were connected using the "OR" operator and were searched with the field tag for "Country" (CU).

To locate papers based on the different types of hepatitis, the following keywords were used with the field tag "TS": "Hepatitis A" OR "HAV"; "Hepatitis B" OR "HBV"; "Hepatitis C" OR "HCV"; "Hepatitis D" OR "HDV" OR "Hepatitis Delta," and "Autoimmune Hepatitis."

Statistical Analysis

Using the WOS tools, all gathered data were analyzed on the basis of the following parameters: country, year, organization, journal, author, total citations, citations without self-citation, h-index, and citations per paper and year. To determine the effects of international collaboration for each country, we excluded articles with affiliations from more than one country. Other analyses, including the preparation of graphs, were performed using Microsoft Excel 2013. In the final determination of the results, any author or affiliation from a country outside the ME was excluded.

RESULTS

In the time frame from 2005 to 2014, there were 103,096 papers that used the word "hepatitis" in their title, abstract, or keywords. Among these, only 6,540 (6.34%) of the papers were affiliated to countries in the ME (Figure 1). The number of hepatitis-related contributions for each country in the ME is shown in Table 1. Turkey, Iran, Egypt, Israel, and Saudi Arabia are the top five countries for published hepatitis-related papers, each with more than 100 papers in the field. Only these countries were included in other analyses. The numbers of papers for these five countries and their publication years are shown in Figure 2.

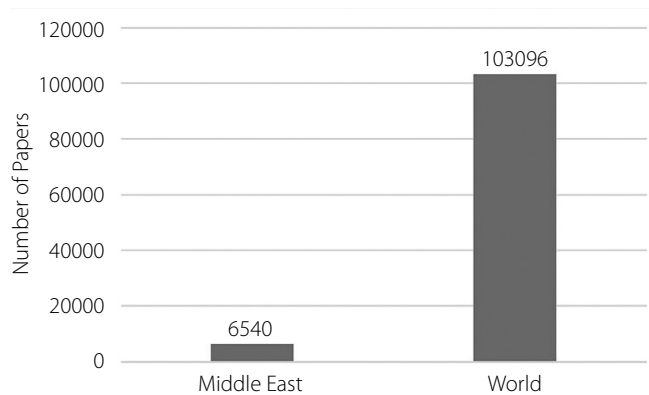


Figure 1. Number of hepatitis-related papers for the Middle East and worldwide (2005–2014)

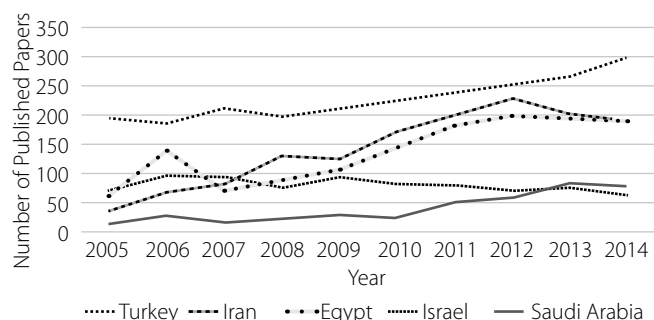


Figure 2. Number of hepatitis-related papers for country and year (2005–2014)

The highest number of papers in terms of the h-index, total citations, and citations per year was reported for Israel, followed by Turkey, Egypt, Iran, and Saudi Arabia (Table 2). To determine the effect of international collaboration, three parameters were used in the analysis, namely, the h-index, total number of citations, and number of papers both with and without international collaboration. It was determined that, without considering collaboration, the total number of citations for Israel and Saudi Arabia decreased from 18,622 to 6,044 and from 4,380 to 1,007, respectively (Figures 3, 4, and 5).

Hepatitis Monthly is the journal with the most published hepatitis-related papers in the ME region. Tehran University of Medical Sciences is the organization with the most papers published, and Seyed Moayed Alavian is the author who has published the most papers. The top ten journals, authors, and organizations in countries in the ME with the most hepatitis-related papers are shown in Tables 3, 4, and 5, respectively.

Most papers on hepatitis A, B, and D and autoimmune hepatitis were published in Turkey, and Egypt was the source of most papers on hepatitis C. The numbers of papers based on the different types of hepatitis, including hepatitis A, B, C, and D and autoimmune hepatitis, are shown in Figure 6.

DISCUSSION

Our results reveal that the number of hepatitis-related papers in the ME has grown annually. However, these papers comprise

Table 1. Number of Published Papers in the Field of Hepatitis Based on Middle Eastern Countries (2005–2014)^a

Country	Number of papers	Middle East ranking	World ranking
Turkey	2289	1	15
Iran	1436	2	19
Egypt	1383	3	20
Israel	817	4	25
Saudi Arabia	422	5	37
Lebanon	73	6	63
United Arab Emirates	56	7	68
Qatar	53	8	69
Kuwait	48	9	71
Jordan	26	10	83
Cyprus	24	11	84
Oman	22	12	86
Syria	21	13	88
Iraq	20	14	89
Yemen	20	15	89
Bahrain	6	16	101
Palestine	0	17	-

^a: Note that because of international collaboration between countries in the ME, the sum of all papers for each country based on this table cannot indicate the total number of hepatitis-related papers for the ME

Table 2. Characteristics of the Top Five Countries in the Middle East with the Most Hepatitis-Related Papers (2005–2014)^a

Country	Total citations	Citations: self-citation	Citations per paper	Citations per year	Open access (Yes/No)	h-Index
Turkey	17242	15471	7.53	1567.45	367/1922	48
Iran	8016	5436	5.58	728.73	666/770	31
Egypt	10401	9023	7.52	945.55	228/1155	45
Israel	18622	18018	22.79	1692.91	56/761	58
Saudi Arabia	4380	4163	10.38	398.18	126/296	23

^aCitation analysis was conducted until November 28, 2015

fewer than 7% of all papers on hepatitis worldwide. Of the ME countries in this analysis, Turkey had the most papers on hepatitis published during the last ten years, and from 2008 onward Iran had the second highest number of hepatitis-related publications.

In an analysis of the top ten authors, Turkey, Egypt, and Israel each had three authors on the list, whereas Iran, as the country with the second highest number of hepatitis-related papers, surprisingly only had one author. The medical universities of Iran, including Tehran, Baqiyatallah, and Shahid Beheshti, were the three universities in Iran with the most research published

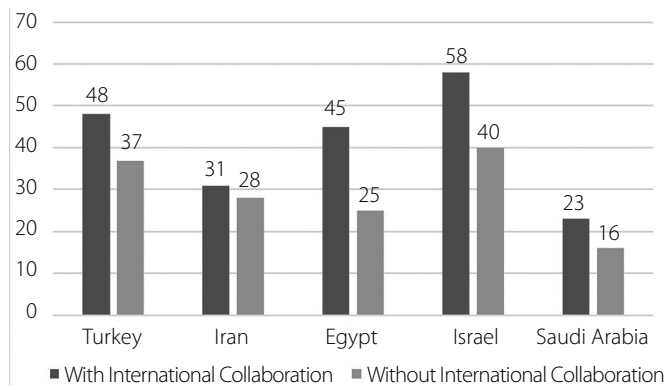


Figure 3. H-Index for the top five countries in the Middle East regarding hepatitis papers, with (total papers) and without international collaboration (2005–2014) (citation analysis was conducted until November 28, 2015)

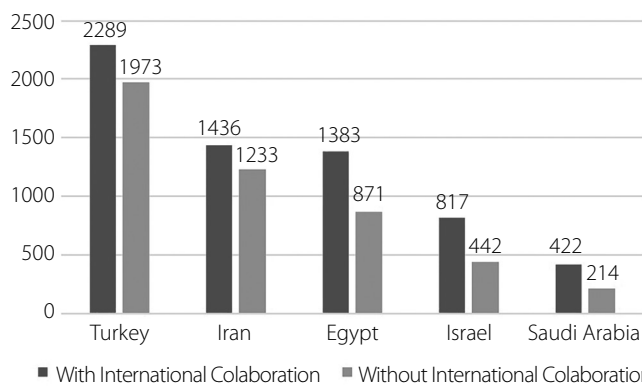


Figure 5. Number of papers for the top five countries in the Middle East regarding hepatitis papers, with (total papers) and without international collaboration (2005–2014)

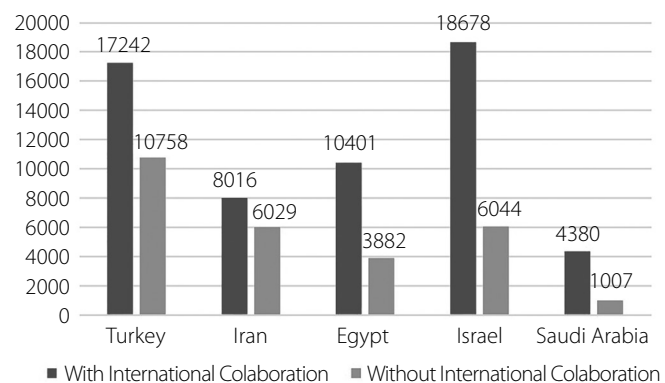


Figure 4. Total citations for the top five countries in the Middle East regarding hepatitis papers, with (total papers) and without international collaboration (2005–2014) (citation analysis was conducted until November 28, 2015)

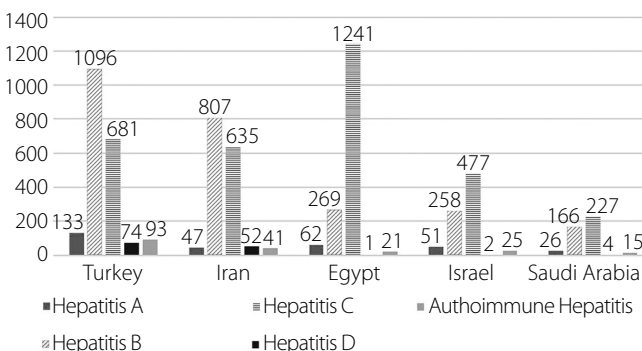


Figure 6. Number of papers for the top five countries in the Middle East regarding the type of hepatitis (2005–2014)

Table 3. Top ten authors in Middle Eastern countries with the most hepatitis-related papers based on the Web of Science database (2005–2014)^a

Author name	Country of author	World rank	Number of published papers	h-Index	Total citations	Total citations without self-citation	Citations per item	Citations per year
Alavian SM	Iran	13	291	21	1860	1375	6.39	186
Yurdaydin C	Turkey	92	135	20	2103	1989	15.58	191.18
Esmat G	Egypt	126	96	17	991	935	10.32	99.10
Idilman R	Turkey	142	85	11	533	505	6.27	53.30
Abdel-Hamid M	Egypt	ND	71	21	1109	1043	15.62	100.82
Shoenfeld Y	Israel	ND	67	24	1542	1385	23.01	140.18
Mohamed MK	Egypt	ND	63	18	683	624	10.84	62.09
Yilmaz Y	Turkey	ND	62	15	728	617	11.74	80.89
Shouval D	Israel	ND	61	14	3191	3167	52.31	290.09
Neumann AU	Israel	ND	57	20	1288	1235	22.60	117.09

ND: Not Determined. WOS only shows the first 500 related authors.
^aCitation analysis was conducted until November 28, 2015

on hepatitis. They were also listed among the top ten organizations where research on hepatitis-related projects has been conducted; consequently, there are other Iranian authors working in the field of hepatitis who are not on the list of the top ten authors but are still highly productive in the field of hepatitis.

One of the more interesting results of our paper is related to the effect of international collaboration. As mentioned above, for this purposes of this paper we investigated three criteria of research success both with and without international collaboration, namely the total number of papers, total number of cita-

Table 4. Top ten journals publishing hepatitis-related papers in Middle Eastern countries based on the Web of Science database (2005–2014)

Journal name	Number of published papers	IF
Hepatitis Monthly	406	1.932
Hepatology	278	11.055
Journal of Hepatology	274	11.336
World Journal of Gastroenterology	171	2.369
Liver Transplantation	133	4.241
Journal of Viral Hepatitis	113	3.909
Turkish Journal of Gastroenterology	107	0.779
International Journal of Infectious Diseases	87	1.859
Journal of Clinical Virology	79	3.016
European Journal of Gastroenterology & Hepatology	78	2.253

Table 5. Top ten organizations in Middle Eastern countries with the most hepatitis-related papers based on the Web of Science database (2005–2014)^a

Organization	Country	Number of published papers	h-Index
Tehran University of Medical Sciences	Iran	414	22
Cairo University	Egypt	382	24
Tel Aviv University	Israel	301	39
Istanbul University	Turkey	273	25
Ankara University	Turkey	266	26
Hebrew University of Jerusalem	Israel	255	37
Ain Shams University	Egypt	251	27
Baqiyatallah University of Medical Sciences	Iran	210	17
Shahid Beheshti University of Medical Sciences	Iran	193	17
Menofia University	Egypt	181	19

^aCitation analysis was conducted until November 28, 2015.

tions, and h-index. International collaboration had the largest effect on research in Israel and Saudi Arabia for all three factors. It does not come as a surprise, however, that Iran was the country least influenced by international collaboration. As expected, sanctions can lead to limitations on the development of international medical research projects (20). However, despite these limitations, Iran has been able to publish research on hepatitis within the country each year (21). One of the factors contributing to such productivity is probably the existence of an Iranian journal specifically dedicated to the field of hepatitis, *Hepatitis Monthly*, which published the most papers on hepatitis within the ME region (22). Another contributing factor is the fact that many international conferences are held in Iran, such as the Tehran Hepatitis Conference, which has led to collaboration between scientists from different countries (23).

Our results show that there is a pattern of correlation between the prevalence of viral forms of hepatitis and the number of

papers published on these diseases in certain countries. For example, most hepatitis research projects in Egypt, Israel, and Saudi Arabia address HCV infections, with the second highest number of publications addressing HBV infections. Egypt is a country with a high prevalence of HCV infections, and the prevalence of anti-HCV antibodies in the general population is approximately 15–20% (11). As a result, Egypt has the most papers on HCV infections among the countries in the ME. Israel has focused on HCV infections more than on other viral forms of hepatitis, and this is correlated with the fact that the prevalence of HCV infections in Israel is approximately 1.96%, with an even higher rate among immigrants (9). The WHO has classified Saudi Arabia and Jordan as countries with high endemicity of HBV infections, with Turkey following close behind with intermediate endemicity (2). As expected, our results show that in Iran and Turkey, most research projects in the field of viral forms of hepatitis address HBV infections.

There are other databases such as regional databases for the ME and also Scopus that could be used for the calculation of the number of papers in our study. However, as we said before and because of citation calculations, we had to choose one database and we selected WOS. Furthermore, as we mentioned in the Introduction section, the ME is a region with countries with different levels of economic prosperity and gross domestic product per capita, which means that research budgets can vary among the different countries of the ME, and this can directly affect the number of papers.

The ME needs special attention regarding viral hepatitis (24) and, with new treatment strategies, the elimination of HCV infections can be possible (25). Taking into account the reported prevalence of forms of hepatitis in the ME, we believe that both the quantity and quality of hepatitis-related papers in this region should be improved. Implementing multicenter and international research projects, holding conferences and congresses, conducting educational workshops, and establishing high-quality hepatitis-related journals in the region will help countries in the ME produce more research in this field.

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Conflict of Interest: S.M.A. is the director of Middle East Liver Diseases (MELD) center and M.S.R-Z. is a member of this center. S.M.A. and M.S.R-Z are editor in-chief and associate editor of *Hepatitis Monthly* journal respectively.

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