

Diabetes research in Middle East countries; a scientometrics study from 1990 to 2012

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Background: Diabetes burden is a serious warning for urgent action plan across the world. Knowledge production in this context could provide evidences for more efficient interventions. Aimed to that, we quantify the trend of diabetes research outputs of Middle East countries focusing on the scientific publication numbers, citations, and international collaboration. **Materials and Methods:** This scientometrics study was performed based on the systematic analysis through three international databases; ISI, PubMed, and Scopus from 1990 to 2012. International collaboration of Middle East countries and citations was analyzed based on Scopus. Diabetes' publications in Iran specifically were assessed, and frequent used terms were mapped by VOSviewer software. **Results:** Over 23-year period, the number of diabetes publications and related citations in Middle East countries had increasing trend. The number of articles on diabetes in ISI, PubMed, and Scopus were respectively; 13,994, 11,336, and 20,707. Turkey, Israel, Iran, Saudi Arabia, and Egypt have devoted the five top competition positions. In addition, Israel, Turkey, and Iran were leading countries in citation analysis. The most collaborative country with Middle East countries was USA and within the region, the most collaborative country was Saudi Arabia. Iran in all databases stands on third position and produced 12.7% of diabetes publications within region. Regarding diabetes researches, the frequent used terms in Iranian articles were "effect," "woman," and "metabolic syndrome." **Conclusion:** Ascending trend of diabetes research outputs in Middle East countries is appreciated but encouraging to strategic planning for maintaining this trend, and more collaboration between researchers is needed to regional health promotion.

Key words: Diabetes, Middle East, scientometrics

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INTRODUCTION

Improvement of science and technology considered as the essential requirement for social development all over the world. In each country, the knowledge production outputs reflect the interesting topics of researches.^[1] Knowledge creation process provide the fundamental integral part of knowledge life cycle for creating, sharing, translating, and applying the generated knowledge for health promotion.^[2]

Research-based Knowledge could be followed by the trends of scientometrics indicators that quantify documented research outputs in the scholarly communication framework.^[3] These indicators for different fields of sciences show the scientific outputs, as a part of research activity of each country or even scientific unit. The special aim of this indicator system is characterizing and comparing the contribution of

research units in the world's scientific research activities and clarifying points that need to be strengthened.^[4]

Comparisons between different countries results of these metrics determine their prospects and performance of research fields. For each country; the quantity and quality of indexed articles in international databases is an important indicator of its contribution to specific field knowledge production.^[5,6]

In recent decades, noncommunicable diseases (NCDs) have been intended as the most significant health problem with increasing trend, thus knowledge production in this field has been important.^[7] One of the leading cause of death due to NCDs is diabetes. In the Middle East and North Africa (MENA); disability-adjusted life year (DALY) rank's percentage change of diabetes was 87% from 1990 to 2010. In this region, diabetes was the fifth leading cause of disability while in other regions this rank varies from six to ten.^[8]

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Ascending trend of diabetes prevalence in these countries leads to more premature heart disease and stroke that should be more emphasized through preventive health policies.^[9-11]

Efficient preventive and health care interventions need to accurate and priority based national knowledge.^[12] Comparison scientometric indicators between different countries determine their prospects and performance in this fields. Authorship as indicator of research activity and citation as indicator of reception of research are deterministic indicators that measured through international databases. In addition, collaboration measurement is an indicator of research systems' structure at the macro level. As we know, the scientometric study was not performed in the diabetes field in MENA. Therefore, we performed the present study by considering some constant indicators. This paper aims to assess the trends of published articles and citations in the diabetes field as the proxy of these countries' research activities during the past 23-year period and review the collaborative researches between regions' country. In addition, we specifically focused on Iran and assessed its contribution in diabetes researches by details of scientometrics outputs of Iranian articles.

MATERIALS AND METHODS

The present study is scientometric analysis of diabetes research articles among Middle East countries from 1990 to 2012. We searched three international indexing databases with the most coverage in health and biomedicine discipline. These are ISI Web of Science (ISI/WOS), PubMed/Medline, and Scopus.^[13-16]

In this study, we considered 23-year, and all databases searched for published articles related to diabetes by Middle East countries. The Middle East countries consist of Bahrain, Cyprus, Egypt, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates (UAE), and Yemen (in alphabetical order).^[17] As, these databases covered same journals in some cases, all results stored in EndNote X5 software, Thomson Reuters, USA and duplicate cases was excluded.

Search strategy has designed by researchers' committee and validated by external scientific group. Based on the controlled vocabulary of Medical Subject Heading, and Emtree, the term of "diabetes" used as a major quarry for indexing and extracting in mentioned database. Through that, we retrieved all records indexed under our predefined search strategy. Limitations were the period of papers (1990–2012), the countries that papers were submitted from (based on authors' affiliation or address). Search strategy for each database present in Box 1.

Box 1: Used search strategies in three international databases

Box 1: Search strategies

- Search strategy in ISI Web of Science
Time span = 1990-2012. Databases=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH.
Topic= (diabetes) AND Address= (Country's name)
- Search strategy in PubMed/Medline
((diabetes [Title/Abstract] OR diabetes [Transliterated Title]) OR ("diabetes mellitus"[MeSH Terms])) AND Country's name [Affiliation] AND ("1990/01/01"[PDAT]: "2012/12/31"[PDAT])
- Search strategy in Scopus
(TITLE-ABS-KEY (diabetes) AND AFFIL (Country's name)) AND PUBYEAR > 1989 AND PUBYEAR < 2013

In this way, systematic search was performed in each databases and the number of published articles related to diabetes by each country in MENA determined. Among these databases, PubMed provides the opportunity of article type analysis. Thus, the article type was investigated among those papers that were retrieved from PubMed. Citation analysis was performed based on Scopus database. As citation to published articles by Middle East countries regarding diabetes needs the time, we analyzed citation from 2000 to 2012. Also, collaboration of Middle East countries in diabetes' knowledge production was studied based on Scopus' results.

For estimating of *P* trends, the number of articles and citations imported to STATA software, version 11, StataCorp LP, USA and by Pearson Chi-square, *P* trends were estimated. Mann-Kendall (MK) test is a statistical test commonly used for trend analysis in time series data. The null hypothesis of this test assumes that there is no trend that is, The data is independent and randomly ordered.^[18] We designed figures using R software 3.1 (the Free Software Foundation's GNU General Public License).

In the later part of this article, we specifically focus on diabetes research in Iran. We also introduce research institutions and journals that had most articles on diabetes. The information about research budget and academic members of Iran retrieved from ministry of health website.^[19]

Iranian published articles were categorized according to subject area, document type, affiliation of the authors and source title. To demonstrate the indexing pattern of diabetes' articles terms in Scopus databases, we used VOSviewer mapping software of Centre for Science and Technology Studies, Leiden University, The Netherlands.^[20] We considered Scopus database because the number of diabetes articles of Iran in this database was more than the others. Using the VOSviewer and thresholds of minimally

10 fractionally counted papers for each term, a national map of diabetes articles term was generated. Each term meet the threshold, a relevance score will be calculated and based on the score, the most relevant terms were selected. For mapping Scopus diabetes articles terms, maps created based on title and abstract field.

RESULTS

Trend of diabetes publication

Through a systematic search for diabetes publication by Middle East countries, we found 14,022 article in ISI/WOS, 11366 articles in PubMed/Medline, and 20,707 articles in Scopus. The details presented in Appendix A. After deletion of duplications, the number of articles reaches 31,143. The time trend of these articles has been showed in Figure 1.

Pearson Chi-square test showed that time trends of articles in various countries are different significantly ($P = 0.000$). The MK test provides remarkable insight about annual publication on diabetes for Turkey, Iran and Israel. The MK correlation (ρ) indicates that there is an increasing publication trend for these countries ($P = 0.968, 0.936, 0.919$ respectively). The correlation, however, is not strong for countries like Syria, Cyprus and Yemen ($P = 0.587, 0.691, 0.701$ respectively) compared to other countries. As shown in Figure 1, more than 80% of articles had been published after 2000. According to Figure 1, turkey and Iran from 2001 to 2003 have the steepest slope. From 1990 to 2012, about 70% of knowledge production on diabetes was done by three counterparts; Turkey (30.2%), Israel (27.4%), and Iran (12.7%). However, since 2011, Iran took the second place with 22.1% knowledge production in this region. As shown in Table 1, Syria (1.5%), Yemen (2.5%) and Palestine (2.8%) had the lowest contribution in diabetes knowledge production among Middle East's countries.

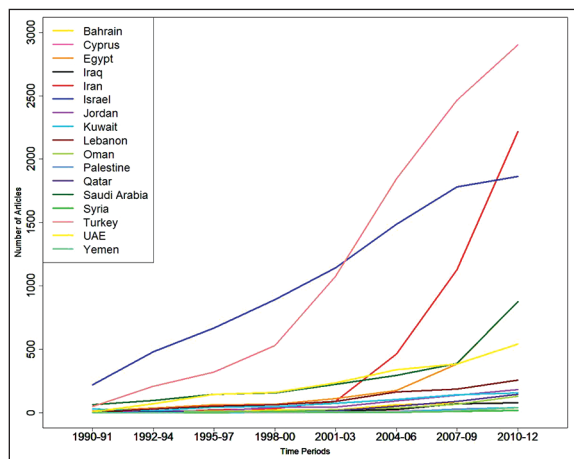


Figure 1: The trend of publications on diabetes in Middle East countries from 1990 to 2012

Diabetes' articles type

Based on PubMed database, 11366 articles on diabetes in Middle East during 1990-2012 were divided to original article (72.44%; except clinical trials), review article (9.28%), clinical trial (8.71%), case report (8.03%), systematic review (1.17%), meta-analysis (0.26%), letter (0.07%), and editorial (0.04%). Along the time, type of article was varied within each country. Figure 2 shows this difference between 2000 and 2012.

International collaboration among diabetes' articles

Based on Scopus' results from 1990 to 2012, the most collaborative country with Middle East countries in diabetes articles is USA. As shown in Table 2, in some region's country such as Lebanon, joint articles with USA is 62.1%. Within the region, the most collaborative country is Saudi Arabia. Also, UAE collaborates with four countries in this regard.

Citing article

Citations based on Scopus database among Israel, turkey and Iran have ascending trend. From 1990 to 2012, Syria has the less citation (349) and Israel has the most citation (191,740). Citation per paper for Israel was higher than other countries. This index in other Middle East countries are as follow; Lebanon (23), UAE (12), Cyprus (11), Kuwait and Syria (10), Jordan, Oman, Palestine and turkey (9), Egypt, Qatar, Yemen Saudi Arabia (8), and Iran, Iraq, and Bahrain (6). As citation needs time, we present trend of citation to diabetes publications of Middle East countries from 2000. The time trends of citations significantly are different among region's countries. It is shown in Figure 3.

Diabetes publication in Iran

Iran has published 1697 article related to diabetes indexed in ISI Web of Science, 1470 article in PubMed and 3013 article

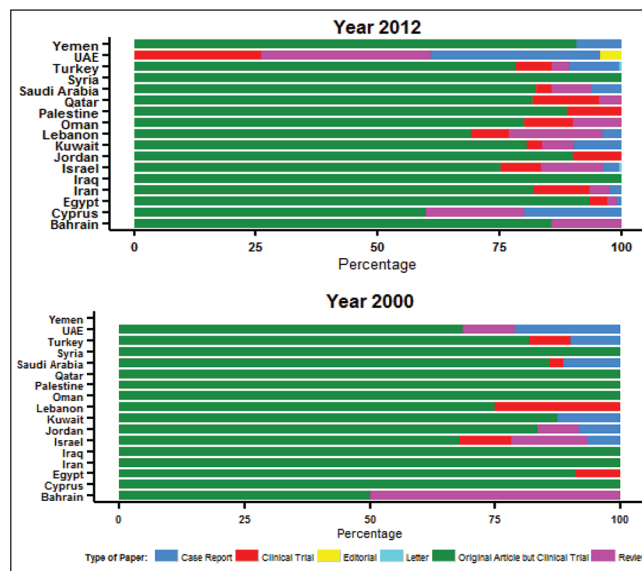


Figure 2: The pattern of diabetes' article types in 2000 and 2012 based on PubMed database

Table 1: Distribution of publications on diabetes in middle east countries from 1990 to 2012

| Middle east countries | Number of diabetes publication (1990-2012) | Contribution (%) in Diabetes Publication (1990-2012) | Growth rate (%) of diabetes publication (2011-2012) | Mann-Kendall correlation rho | P-trend |
|-----------------------|--------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------|---------|
| Bahrain | 283 | 0.91 | 23.1 | 0.724 | 0.0000 |
| Cyprus | 89 | 0.29 | 20.0 | 0.691 | 0.0000 |
| Egypt | 1727 | 5.55 | 23.5 | 0.895 | 0.0000 |
| Iraq | 215 | 0.69 | -3.3 | 0.730 | 0.0000 |
| Iran | 3958 | 12.71 | 9.0 | 0.936 | 0.0000 |
| Israel | 8540 | 27.42 | 13.0 | 0.919 | 0.0000 |
| Jordan | 538 | 1.73 | -12.5 | 0.819 | 0.0000 |
| Kuwait | 610 | 1.96 | -11.5 | 0.740 | 0.0000 |
| Lebanon | 843 | 2.71 | 7.2 | 0.885 | 0.0000 |
| Oman | 292 | 0.94 | -27.5 | 0.789 | 0.0000 |
| Palestine | 87 | 0.28 | 0.0 | 0.705 | 0.0000 |
| Qatar | 315 | 1.01 | -3.6 | 0.821 | 0.0000 |
| Saudi Arabia | 2242 | 7.20 | 13.8 | 0.904 | 0.0000 |
| Syria | 46 | 0.15 | 166.7 | 0.587 | 0.0003 |
| Turkey | 9398 | 30.17 | 15.1 | 0.968 | 0.0000 |
| UAE | 1885 | 6.05 | -14.3 | 0.901 | 0.0000 |
| Yemen | 77 | 0.25 | -5.9 | 0.701 | 0.0000 |
| Total | 31145 | 100 | 10.2 | | |

Table 2: International collaboration of Middle East countries in knowledge production on diabetes based on Scopus database

| Middle east countries | Total article | The most collaborative country | Number (%) | The most collaborative country within region | Number (%) |
|-----------------------|---------------|--------------------------------|-------------|----------------------------------------------|------------|
| Bahrain | 222 | Tunisia | 26 (11.7) | UAE | 22 (9.9) |
| Cyprus | 70 | Greece | 24 (34.3) | Turkey | 4 (5.7) |
| Egypt | 1177 | Saudi Arabia | 117 (9.9) | Saudi Arabia | 117 (9.9) |
| Iraq | 157 | Jordan | 6 (3.8) | Jordan | 6 (3.8) |
| | | Saudi Arabia | 6 (3.8) | Saudi Arabia | 6 (3.8) |
| Iran | 3013 | USA | 106 (3.5) | Saudi Arabia | 8 (0.3) |
| Israel | 5779 | USA | 2245 (38.8) | Turkey | 30 (0.5) |
| Jordan | 388 | USA | 51 (13.1) | Saudi Arabia | 21 (5.4) |
| Kuwait | 511 | USA | 59 (11.5) | UAE | 38 (7.4) |
| Lebanon | 567 | USA | 352 (62.1) | Bahrain | 19 (3.4) |
| Oman | 222 | UAE | 32 (14.4) | UAE | 32 (14.4) |
| Palestine | 76 | Jordan | 10 (13.2) | Jordan | 10 (13.2) |
| Qatar | 220 | UK | 37 (16.8) | UAE | 33 (15.0) |
| Saudi Arabia | 1660 | USA | 123 (7.4) | Egypt | 117 (7.0) |
| Syria | 35 | USA | 8 (22.9) | Turkey | 4 (11.4) |
| Turkey | 5931 | USA | 247 (4.2) | Israel | 23 (0.4) |
| UAE | 644 | UK | 97 (15.1) | Saudi Arabia | 38 (5.9) |
| Yemen | 55 | Oman | 16 (29.1) | Oman | 16 (29.1) |
| | | Qatar | 16 (29.1) | Qatar | 16 (29.1) |

in Scopus from 1990 to 2012. By excluding duplicates, 3958 article was remained.

According to ISI Web of Science database, clinical biochemistry (3.6%), diabetes research and clinical practice (3.4%), Journal of Research in Medical Sciences (3.0%), Transplantations Proceedings (1.9%), Pakistan Journal of Medical Sciences (1.8%), Archives of Iranian Medicine (1.6%), and Iranian Journal of Public Health (1.5%) were

most frequent sources title in Iran. About 85.3% of Iranian articles about diabetes published in foreign journals.

Based on Scopus database, the five top rank journals for diabetes publications are Iranian Journal of Diabetes and Lipid Disorders (4.8%), Iranian Journal of Endocrinology and Metabolism (3.5%), Journal of Research in Medical Sciences (2.3%), Journal of Medicinal Plants (2.1%), and Acta Medica Iranica (1.9%) respectively.

From medical sciences universities in Iran, Tehran University of Medical Sciences had most publication on diabetes (38.1% in ISI/WOS, 30.6% in Scopus) and then Shahid Beheshti University of Medical Sciences (14.2% in ISI/WOS, 11.5% in Scopus) and Isfahan University of Medical Sciences (10.2% in ISI/WOS, 11% in Scopus) have second and third position. Assess the proportion of diabetes publications to research budget and academic members among mentioned universities in Iran show academic members, as professional resource is compatible with diabetes publication and trend of research budget is different from diabetes publications' trend. Figure 4 shows the trend of three top rank universities of Iran in diabetes publication adjusted to Research budget and Academic member in recent years.

In mapping the Scopus terms frequency network, from the 9922 terms, 412 terms meet the threshold. Then 247 terms selected as relevant terms based on calculated relevance score. Figure 5 shows the label view with connection lines.

Figure 5 demonstrates the network of frequently used terms in diabetes-related Iranian articles. Colored regions show subject areas of researches. The font size is an indication of terms frequency. For example, "metabolic syndrome" term has more publicized than "diet" term. Some common terms between the borders of the major region refer to common research fields. In addition, the size of bubbles and related terms font reflects terms frequency. Based on the map the terms of "woman" and "effect" had most frequency. It is noticeable that less frequent terms, for example coronary artery, have inconspicuous view.

DISCUSSION

The burden of diabetes has increased dramatically through two past decades.^[8] Many countries attend to diabetes

researches because, priority based researches could produce scientific evidence for addressing health threatening problems such as diabetes.^[21-23]

In Middle East, Turkey, Israel, and Iran have considerable ascending trends of diabetes publication. In Turkey and Iran, size of the population and consequently the size of professional researchers, and developing specialized research centers are effective factors in this progress.^[24] Israel has lower population size but strongly collaborate with international researchers so that about half of their publications on diabetes are in collaborating with USA.

As shown in Table 3, despite appropriate human and financial resources, some countries have been shown less interest in diabetes publications.^[25,26] In some cases such as Bahrain and Oman diabetes' DALY is noteworthy alarming but their publication in this regards is low. Similarly, this mismatch between the burden of disease and knowledge production is seen in India and China.^[27] Health relies on valid, reliable, and accessible knowledge thus attention of policy makers on proper resource allocation could provide the appropriate context for research, knowledge production and consequently healthy situation.

In this regards, maintain ascending trend of publication needs more attention. A bibliometric study on diabetes

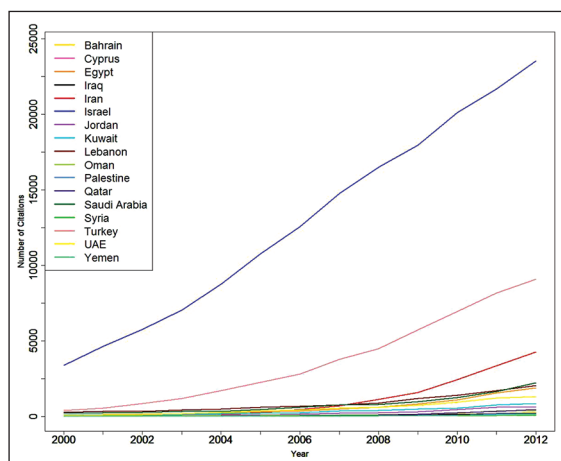


Figure 3: The trend of citation to diabetes articles in Middle East countries from 1990 to 2012

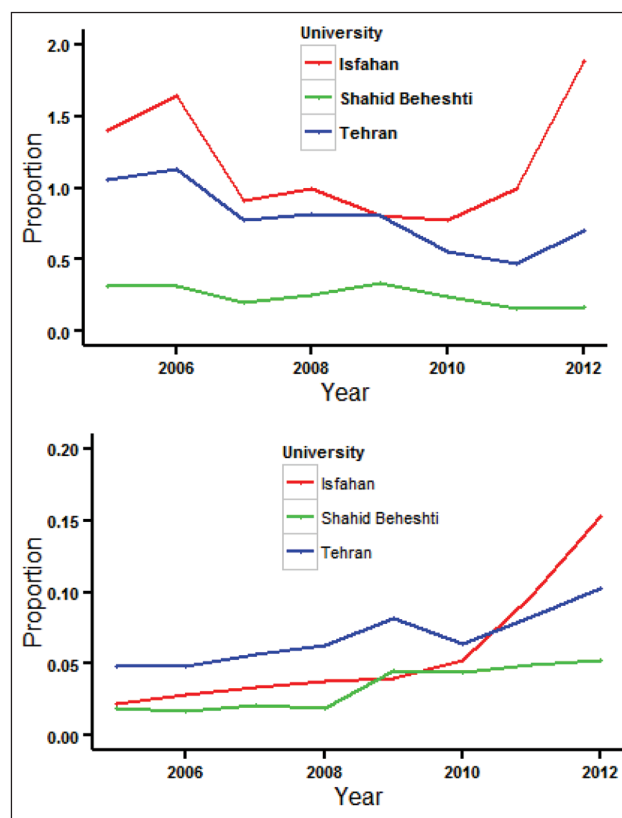


Figure 4: The trend of three top rank universities of Iran in diabetes publication adjusted to research budget (a) and academic member (b)

Appendix A

Middle East publication about diabetes in ISI

| Year | Iran | Cyprus | Irag | Lebanon | Palestine | Syria | Yemen | Egypt | Israel | Qatar | Turkey | Bahrain | Jordan | Oman | Saudi Arabia | UAE | Kuwait | Total |
|-------|------|--------|------|---------|-----------|-------|-------|-------|--------|-------|--------|---------|--------|------|--------------|-----|--------|--------|
| 2012 | 342 | 9 | 6 | 51 | 4 | 4 | 11 | 139 | 387 | 21 | 513 | 15 | 29 | 10 | 166 | 11 | 27 | 1745 |
| 2011 | 353 | 10 | 9 | 35 | 1 | 3 | 7 | 142 | 352 | 19 | 420 | 11 | 28 | 18 | 140 | 14 | 35 | 1597 |
| 2010 | 244 | 6 | 9 | 43 | 1 | 5 | 7 | 76 | 352 | 16 | 419 | 12 | 31 | 15 | 84 | 10 | 40 | 1370 |
| 2009 | 211 | 2 | 8 | 40 | 2 | 1 | 4 | 72 | 339 | 14 | 437 | 19 | 25 | 16 | 68 | 15 | 33 | 1306 |
| 2008 | 191 | 7 | 11 | 22 | 1 | 2 | 2 | 47 | 343 | 9 | 418 | 6 | 18 | 8 | 52 | 17 | 37 | 1191 |
| 2007 | 139 | 5 | 13 | 25 | 0 | 3 | 0 | 38 | 322 | 10 | 391 | 8 | 13 | 13 | 40 | 17 | 24 | 1051 |
| 2006 | 68 | 3 | 6 | 24 | 1 | 0 | 0 | 32 | 258 | 6 | 339 | 7 | 13 | 5 | 49 | 30 | 21 | 862 |
| 2005 | 51 | 6 | 2 | 26 | 2 | 1 | 1 | 25 | 273 | 7 | 281 | 9 | 9 | 10 | 34 | 9 | 27 | 773 |
| 2004 | 33 | 2 | 0 | 29 | 0 | 0 | 3 | 24 | 290 | 4 | 207 | 5 | 12 | 5 | 41 | 22 | 26 | 703 |
| 2003 | 25 | 0 | 4 | 20 | 0 | 0 | 1 | 20 | 245 | 0 | 194 | 2 | 8 | 3 | 35 | 11 | 14 | 582 |
| 2002 | 10 | 1 | 1 | 16 | 1 | 0 | 0 | 21 | 205 | 1 | 154 | 2 | 11 | 4 | 28 | 14 | 25 | 494 |
| 2001 | 4 | 0 | 1 | 14 | 0 | 0 | 0 | 12 | 205 | 1 | 112 | 1 | 1 | 1 | 23 | 19 | 12 | 406 |
| 2000 | 5 | 1 | 2 | 7 | 0 | 2 | 0 | 13 | 190 | 0 | 85 | 3 | 7 | 1 | 28 | 11 | 16 | 371 |
| 1999 | 5 | 0 | 1 | 13 | 0 | 3 | 3 | 10 | 164 | 1 | 79 | 2 | 4 | 4 | 25 | 9 | 11 | 334 |
| 1998 | 4 | 0 | 1 | 9 | 0 | 0 | 1 | 11 | 159 | 1 | 52 | 1 | 2 | 2 | 28 | 5 | 7 | 283 |
| 1997 | 7 | 1 | 0 | 8 | 0 | 0 | 1 | 10 | 123 | 0 | 43 | 2 | 3 | 1 | 21 | 5 | 16 | 241 |
| 1996 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 10 | 104 | 0 | 45 | 0 | 2 | 4 | 28 | 5 | 5 | 206 |
| 1995 | 4 | 0 | 0 | 8 | 0 | 0 | 0 | 6 | 91 | 1 | 40 | 0 | 1 | 1 | 33 | 7 | 6 | 198 |
| 1994 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 4 | 96 | 0 | 38 | 1 | 2 | 0 | 16 | 2 | 4 | 167 |
| 1993 | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 1 | 76 | 2 | 21 | 0 | 4 | 1 | 15 | 1 | 2 | 132 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1697 | 54 | 78 | 400 | 13 | 24 | 40 | 714 | 4582 | 113 | 4289 | 106 | 223 | 122 | 954 | 224 | 388 | 14,022 |

Middle East publication about diabetes in PubMed

| Year | Iran | Cyprus | Irag | Lebanon | Palestine | Syria | Yemen | Egypt | Israel | Qatar | Turkey | Bahrain | Jordan | Oman | Saudi Arabia | UAE | Kuwait | Total |
|------|------|--------|------|---------|-----------|-------|-------|-------|--------|-------|--------|---------|--------|------|--------------|-----|--------|-------|
| 2012 | 334 | 5 | 9 | 26 | 9 | 2 | 11 | 106 | 241 | 22 | 372 | 7 | 20 | 10 | 98 | 23 | 31 | 1315 |
| 2011 | 260 | 3 | 4 | 24 | 3 | 2 | 14 | 101 | 215 | 16 | 330 | 6 | 22 | 19 | 112 | 26 | 19 | 1164 |
| 2010 | 202 | 1 | 3 | 25 | 5 | 1 | 7 | 76 | 215 | 9 | 300 | 4 | 24 | 17 | 75 | 17 | 25 | 1003 |
| 2009 | 164 | | 3 | 16 | 6 | 2 | 5 | 65 | 230 | 15 | 305 | 6 | 18 | 12 | 56 | 14 | 26 | 939 |
| 2008 | 154 | 2 | 5 | 17 | 3 | 0 | 3 | 48 | 210 | 6 | 305 | 2 | 21 | 15 | 52 | 21 | 28 | 890 |
| 2007 | 129 | 4 | 9 | 15 | 2 | 1 | 1 | 27 | 217 | 9 | 307 | 2 | 14 | 5 | 43 | 16 | 14 | 815 |
| 2006 | 67 | 2 | 4 | 17 | 1 | 0 | 1 | 26 | 188 | 8 | 296 | 4 | 20 | 5 | 53 | 28 | 21 | 741 |
| 2005 | 53 | 2 | 2 | 16 | 1 | 0 | 1 | 28 | 195 | 6 | 267 | 5 | 12 | 9 | 36 | 15 | 27 | 675 |
| 2004 | 44 | 0 | 2 | 16 | 0 | 0 | 3 | 19 | 214 | 5 | 194 | 5 | 17 | 3 | 43 | 22 | 22 | 609 |
| 2003 | 24 | 0 | 4 | 12 | 1 | 0 | 1 | 21 | 174 | 1 | 183 | 3 | 8 | 7 | 48 | 11 | 12 | 511 |
| 2002 | 14 | 1 | 1 | 9 | 0 | 0 | 2 | 18 | 159 | 2 | 146 | 3 | 10 | 5 | 42 | 14 | 24 | 449 |
| 2001 | 5 | 0 | 0 | 9 | 2 | 0 | 0 | 12 | 144 | 2 | 108 | 1 | 5 | 2 | 31 | 27 | 11 | 360 |

Appendix A (Continued)

| Middle East publication about diabetes in ISI | | | | | | | | | | | | | | | | | | |
|--------------------------------------------------|------|--------|------|---------|-----------|-------|-------|-------|--------|-------|--------|---------|--------|------|--------------|-----|--------|--------|
| Year | Iran | Cyprus | Iraq | Lebanon | Palestine | Syria | Yemen | Egypt | Israel | Qatar | Turkey | Bahrain | Jordan | Oman | Saudi Arabia | UAE | Kuwait | Total |
| 2000 | 5 | 1 | 3 | 4 | 4 | 1 | 0 | 11 | 137 | 1 | 71 | 4 | 12 | 1 | 35 | 19 | 16 | 325 |
| 1999 | 5 | 0 | 0 | 12 | 0 | 1 | 2 | 6 | 130 | 1 | 74 | 1 | 4 | 4 | 23 | 7 | 7 | 276 |
| 1998 | 1 | 0 | 0 | 10 | 0 | 2 | 1 | 8 | 119 | 1 | 43 | 0 | 5 | 1 | 23 | 8 | 6 | 227 |
| 1997 | 3 | 1 | 1 | 6 | 1 | 0 | 1 | 7 | 100 | 0 | 28 | 0 | 2 | 2 | 26 | 7 | 10 | 195 |
| 1996 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 95 | 0 | 32 | 1 | 2 | 4 | 24 | 5 | 5 | 178 |
| 1995 | 2 | 0 | 0 | 4 | 0 | 0 | 1 | 7 | 86 | 1 | 36 | 1 | 1 | 2 | 26 | 5 | 7 | 178 |
| 1994 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 4 | 66 | 0 | 30 | 2 | 2 | 0 | 14 | 2 | 5 | 130 |
| 1993 | 2 | 0 | 2 | 8 | 0 | 0 | 1 | 1 | 64 | 2 | 26 | 1 | 0 | 1 | 16 | 0 | 1 | 124 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 50 | 0 | 7 | 2 | 2 | 0 | 19 | 0 | 2 | 90 |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 46 | 0 | 6 | 0 | 0 | 1 | 18 | 0 | 6 | 80 |
| 1990 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 49 | 0 | 9 | 1 | 0 | 0 | 17 | 0 | 13 | 92 |
| Total | 1470 | 22 | 54 | 250 | 38 | 12 | 55 | 612 | 3344 | 107 | 3475 | 61 | 221 | 125 | 930 | 287 | 338 | 11,366 |
| Middle East publication about diabetes in Scopus | | | | | | | | | | | | | | | | | | |
| Year | Iran | Cyprus | Iraq | Lebanon | Palestine | Syria | Yemen | Egypt | Israel | Qatar | Turkey | Bahrain | Jordan | Oman | Saudi Arabia | UAE | Kuwait | Total |
| 2012 | 632 | 15 | 22 | 62 | 9 | 6 | 11 | 255 | 513 | 33 | 708 | 27 | 49 | 27 | 241 | 62 | 42 | 2714 |
| 2011 | 594 | 11 | 24 | 62 | 12 | 2 | 14 | 224 | 447 | 39 | 633 | 21 | 46 | 39 | 225 | 83 | 42 | 2518 |
| 2010 | 433 | 6 | 16 | 59 | 13 | 6 | 7 | 138 | 420 | 22 | 579 | 15 | 44 | 27 | 149 | 52 | 51 | 2037 |
| 2009 | 355 | 5 | 21 | 59 | 17 | 3 | 5 | 124 | 442 | 22 | 544 | 26 | 43 | 17 | 126 | 45 | 38 | 1892 |
| 2008 | 273 | 7 | 16 | 45 | 4 | 3 | 3 | 81 | 411 | 16 | 525 | 13 | 33 | 17 | 83 | 46 | 49 | 1625 |
| 2007 | 237 | 6 | 17 | 30 | 4 | 3 | 1 | 58 | 407 | 21 | 490 | 19 | 25 | 15 | 78 | 41 | 32 | 1484 |
| 2006 | 179 | 3 | 10 | 41 | 3 | 0 | 1 | 56 | 322 | 17 | 468 | 16 | 33 | 13 | 83 | 58 | 27 | 1330 |
| 2005 | 137 | 4 | 5 | 38 | 4 | 2 | 1 | 36 | 349 | 13 | 410 | 16 | 16 | 14 | 53 | 32 | 33 | 1163 |
| 2004 | 60 | 5 | 3 | 34 | 0 | 0 | 3 | 26 | 363 | 12 | 292 | 15 | 23 | 5 | 63 | 42 | 27 | 973 |
| 2003 | 39 | 0 | 5 | 20 | 1 | 1 | 1 | 27 | 317 | 5 | 276 | 9 | 9 | 12 | 71 | 26 | 21 | 840 |
| 2002 | 25 | 3 | 5 | 15 | 1 | 1 | 2 | 20 | 243 | 5 | 218 | 6 | 11 | 5 | 53 | 26 | 31 | 670 |
| 2001 | 6 | 0 | 1 | 16 | 3 | 0 | 0 | 19 | 219 | 4 | 167 | 2 | 7 | 4 | 44 | 40 | 12 | 544 |
| 2000 | 8 | 1 | 4 | 6 | 4 | 2 | 0 | 15 | 201 | 2 | 114 | 7 | 15 | 2 | 50 | 24 | 20 | 475 |
| 1999 | 10 | 0 | 3 | 21 | 0 | 3 | 2 | 11 | 187 | 1 | 107 | 5 | 5 | 7 | 36 | 12 | 14 | 424 |
| 1998 | 7 | 0 | 1 | 13 | 0 | 2 | 1 | 22 | 169 | 1 | 69 | 10 | 8 | 3 | 39 | 14 | 8 | 367 |
| 1997 | 6 | 1 | 1 | 12 | 0 | 0 | 1 | 13 | 155 | 1 | 51 | 1 | 4 | 2 | 37 | 11 | 17 | 313 |
| 1996 | 4 | 3 | 0 | 7 | 1 | 0 | 0 | 18 | 138 | 0 | 67 | 4 | 2 | 8 | 37 | 10 | 10 | 309 |
| 1995 | 2 | 0 | 0 | 12 | 0 | 1 | 1 | 6 | 99 | 2 | 63 | 2 | 1 | 1 | 37 | 10 | 9 | 246 |
| 1994 | 2 | 0 | 1 | 3 | 0 | 0 | 0 | 10 | 97 | 2 | 60 | 3 | 5 | 1 | 32 | 5 | 5 | 226 |
| 1993 | 2 | 0 | 2 | 9 | 0 | 0 | 1 | 2 | 79 | 1 | 44 | 1 | 6 | 2 | 24 | 4 | 0 | 177 |
| 1992 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 71 | 1 | 15 | 2 | 2 | 0 | 25 | 1 | 2 | 129 |
| 1991 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 61 | 0 | 17 | 0 | 1 | 0 | 25 | 0 | 6 | 115 |
| 1990 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 69 | 0 | 14 | 2 | 0 | 1 | 29 | 0 | 15 | 136 |
| Total | 3013 | 70 | 157 | 567 | 76 | 35 | 55 | 1177 | 5779 | 220 | 5931 | 222 | 388 | 222 | 1640 | 644 | 511 | 20,707 |

Assess the frequent terms used in Iranian articles about diabetes revealed that the terms of “effect,” “woman” are frequent terms in Scopus database. It seems “effect” is used in biomedical articles, but frequently used of “woman” may be signed of researcher attention to more prevalence of diabetes in Iranian women. It is noticeable; heart disease despite its importance in this area was not considered.^[33]

Our study has some strength points. First, we focused on one subject of endocrinology domain to clarify the situation of knowledge production about diabetes as growing and threatening factor. Second, we use three international databases with the most coverage. Third, we assess collaboration between Middle East countries in this area based on the international database and fourth, we explain the situation of Iran as a knowledge productive country in the region in details.

Of course, in our study, we faced with some limitation such as; presence multidisciplinary subject category and overlap between databases categories that considered in scientometric analysis.

CONCLUSION

This study provides a scientometrics analysis about diabetes research in Middle East region and collaboration analysis among this region's countries. Ascending trend of diabetes research outputs in this region is appreciated but encouraging to strategic planning for maintaining this trend, and more collaboration between researchers is needed to regional health promotion. We suggest regional diabetes network^[34] and we hope making confident evidence in this regards.

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AUTHOR'S CONTRIBUTION

NP, ShDj, AK, FF and BL contributed in the conception of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work. ShN and TH had contribution in the general designing of paper, and revision. All authors have given approval to the final version of the manuscript.

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