

## Obesity Researches Over the Past 24 years: A Scientometrics Study in Middle East Countries

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### ABSTRACT

**Background:** Researchers, practitioners, and policy-makers call for updated valid evidences to monitor, prevent, and control of alarming trends of obesity. We quantify the trends of obesity/overweight researches outputs of Middle East countries.

**Methods:** We systematically searched Scopus database as the only sources for multidisciplinary citation reports, with the most coverage in health and biomedicine disciplines for all related obesity/overweight publications, from 1990 to 2013. These scientometrics analysis assessed the trends of scientific products, citations, and collaborative papers in Middle East countries. We also provided Information on top institutions, journals, and collaborative research centers in the field of obesity/overweight.

**Results:** Over 24-year period, the number of obesity/overweight publications and related citations in Middle East countries had increasing trend. Globally, during 1990–2013, 415,126 papers have been published, from them, 3.56% were affiliated to Middle East countries. Iran with 26.27%, compare with other countries in the regions, after Turkey (47.94%) and Israel (35.25%), had the third position. 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.

**Conclusions:** Despite the ascending trends in research outputs, more efforts required for promotion of collaborative partnerships. Results could be useful for better health policy and more planned studies in this field. These findings also could be used for future complementary analysis.

**Keywords:** Iran, Middle East, obesity, scientometrics

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### INTRODUCTION

The prevalence of obesity continues to rise worldwide with an alarming priority in developed and developing countries.<sup>[1-3]</sup> These warnings have been interested stakeholders to exact follow and control the problem.<sup>[2,4]</sup> Researchers, practitioners, and policy-makers

call for updated valid evidences to monitor, prevent, and control of obesity.<sup>[5,6]</sup> This information, mostly, provide through the publication and distribution of research results.<sup>[7-9]</sup> Most of the times, quality of health services affected by the application of updated results of scientific productions.<sup>[8,10,11]</sup>

Aim to monitoring and assessment of scientific trends, scientometrics provides reliable, practical methods that measure, evaluate and analyze scientific products of specific fields.<sup>[12,13]</sup> In these regards, using qualitative, quantitative and computational approaches, different indicators are increasingly employed to show the pattern of research performed by researchers, universities, institutes, and countries.<sup>[12-15]</sup> One of its main indices is the number of published articles or science production in a specific field of sciences.<sup>[13,16,17]</sup>

In addition, citations of papers is another index that mostly is used as a proxy of application of papers.<sup>[13,16]</sup> The collaboration in research conduct and papers publication and collaborative research centers consider as another citation indexes.<sup>[16,17]</sup>

Considering above, the aim of this paper is scientometrics analysis of obesity/overweight knowledge productions in the Middle East region countries. The trends in published papers, citations, and collaborative researches in the fields of obesity/overweight, as the proxy of knowledge production, reviewed, during the past 24-year period. We specifically focused on Iran and assessed its contribution in obesity/overweight researches by more details.

## METHODS

Present study is scientometric analysis of obesity/overweight scientific papers among Middle East countries from 1990 to 2013. Reviewing the publication number, publication trends, citations, and collaborative institutions, Iran has been compared with other countries of the region and also with global indices.

For its' most coverage in health and biomedicine discipline, we systematically searched Scopus database. As it was the only sources for multidisciplinary citation reports, we select it as the valid source of citation reports of knowledge products.<sup>[15-17]</sup>

We focus on papers as the main index of scientific products.<sup>[13,15,17]</sup> The compassion of citation trends used as the proxy of papers' application.<sup>[10,13,15,17]</sup> In addition, all of the collaborative papers extracted and analyzed for Middle East countries. We also introduce top institutions, journals, and collaborative research centers in the field of obesity/overweight.

Using methods of reviews and considering Emtree, terms of "obesity", "overweight", and "anthropometric indexes", search strategy has designed by researchers' committee and validated by external scientific group. The name of Middle East countries were identified according to free encyclopedia of Wikipedia including; Bahrain, Cyprus, Egypt, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen (in alphabetical order).<sup>[18]</sup> Period of study was limited to 1990–2013, and there was no limitation for language. Search strategy presents in Table 1.

Using Pearson Chi-square, P-trends were estimated by STATA package Corp. 2011 (Stata Statistical Software: Release 12. College Station, TX: Stata Corp LP. Package).

## RESULTS

### Trends of publications

Given Scopus data, globally, during 1990–2013, 415,126 papers have been published in the fields of obesity/overweight. From them, 136,595 were affiliated to USA, 33,927 to UK, and 20,019 to Germany.

During this period, 14,792 published papers were affiliated to Middle East countries. Iran published 3,886 papers (26.27%). Compare with other countries in the regions; after Turkey (7092 papers: 47.94%) and Israel (5214 paper: 35.25%), it has achieved to third position. The time trends of published papers have been showed in Figure 1.

Pearson Chi-square test confirmed a significant time trends of published papers between region countries' ( $P = 0.000$ ). Table 2 shows the P-trends of total number of papers and the total number of citations, in Middle East's countries, during the 1990–3013.

### Trends of citations

As it shows in Table 2, based on the Pearson Chi-square test results, all of region countries' have significant

**Table 1: Search strategy**

Search domains	Search strategy
Subject domains	Obesity OR overweight OR "Body Mass Index" OR "BMI" OR adiposity OR "Body Size" OR "Body Fat Distribution" OR "Waist Circumference" OR "Waist-Height Ratio" OR "Waist-Hip Ratio" OR "Waist to Hip Ratio" OR "Waist Hip Ratio" OR "Waist-Height Ratio" OR "Waist-Height Ratio" OR "Waist to Height Ratio" OR "Waist Height Ratio" OR "Weight-for-length" OR "Weight length Ratio" OR "Weight-for-height" OR "Weight height Ratio"
Geographical domains	Bahrain, Cyprus, Egypt, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, and Yemen
Time period	1990-2013

time trends in their obesity/overweight publications' citations ( $P = 0.000$ ). Iran respectively with 20010 citations has the third ranks. The comparative situations of citations' time trends of obesity/overweight publications is presented in Figure 2.

### Collaborative papers

In overall, in the field of obesity/overweight, Iran had the most collaborative papers respectively with

USA (180, 4.6%), UK (140, 3.6%), and Canada (66, 1.7%). Turkey with 15 collaborative papers (0.4%) had the 16<sup>th</sup> rank of this list. USA also had the most participation in publications of all other 16 Middle East countries.

The situation of contributions of Middle East's countries in obesity/overweight related papers have been shown in Table 3. The diagonal diameter of table (green marked number) shows papers that there was no

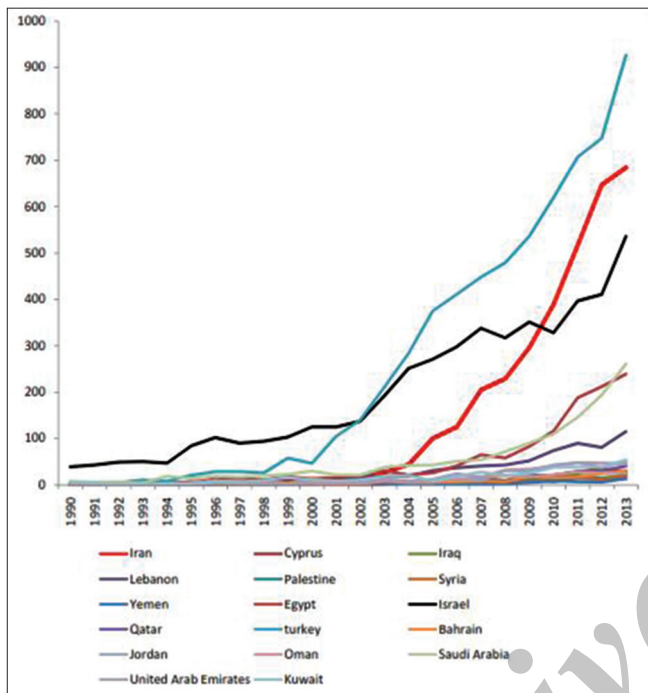


Figure 1: The time trend of obesity/overweight publication by Middle East countries, 1990–2013

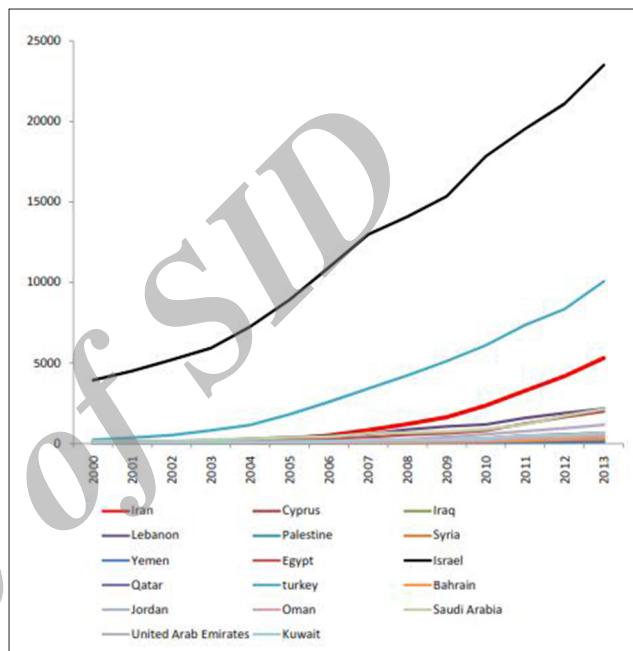


Figure 2: The time trend of citations of obesity/overweight publication by Middle East countries, 1990–2013

Table 2: P-trends of total number of papers and total number of citations of Middle East's countries obesity/overweight related papers, 1990-2013

No	Countries	Total number of papers	P-trend*	Total number of citations	P-trend*
1	Bahrain	198	Significant	1431	Significant
2	Cyprus	184	Significant	2622	Significant
3	Egypt	1205	Significant	8554	Significant
4	Iran	3331	Significant	20010	Significant
5	Iraq	144	Significant	721	Significant
6	Israel	4778	Significant	180079	Significant
7	Jordan	326	Significant	2919	Significant
8	Kuwait	396	Significant	3405	Significant
9	Lebanon	670	Significant	11257	Significant
10	Oman	218	Significant	2088	Significant
11	Palestine	85	Significant	572	Significant
12	Qatar	194	Significant	1487	Significant
13	Saudi Arabia	1311	Significant	10006	Significant
14	Syria	139	Significant	1628	Significant
15	Turkey	6229	Significant	52436	Significant
16	United Arab Emirates	369	Significant	4965	Significant
17	Yemen	55	Significant	330	Significant

\*P value<0.001 was considered as statistically significant

Table 3: Contributions of Middle East's countries in obesity/overweight related papers, 1990-2013

Country	Bahrain	Cyprus	Egypt	Iran	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Palestine	Qatar	Saudi Arabia	Syria	Turkey	United Arab Emirates	Yemen
Bahrain	197	0	9	4	4	3	1	10	14	13	5	16	33	6	1	20	7
Cyprus	0	166	1	4	0	0	0	0	2	0	0	0	1	0	11	1	0
Egypt	9	1	1233	3	4	4	13	31	12	11	5	10	145	2	7	16	8
Iran	4	4	3	3667	4	4	2	4	4	1	2	3	7	0	15	6	1
Iraq	3	0	4	4	104	0	4	4	2	3	1	2	4	2	0	4	1
Israel	1	10	4	4	0	3298	8	2	4	2	10	2	2	3	27	2	4
Jordan	10	0	13	2	4	8	276	7	11	1	16	4	19	9	2	16	0
Kuwait	13	0	31	4	4	2	7	379	10	13	7	15	18	4	2	23	7
Lebanon	14	2	12	4	2	4	11	10	367	3	3	7	11	7	5	8	2
Oman	13	0	11	1	3	2	1	13	3	113	1	17	12	2	2	18	11
Palestine	5	0	5	2	1	10	16	7	3	1	68	5	4	7	2	8	1
Qatar	16	0	10	3	2	2	4	15	7	17	5	227	15	3	1	19	12
Saudi Arabia	33	1	145	7	4	2	19	18	11	12	4	15	1386	3	11	29	6
Syria	6	0	2	0	2	3	9	4	7	2	7	3	3	42	4	4	1
Turkey	1	11	7	15	0	27	2	2	5	2	2	1	11	4	6674	5	0
United Arab Emirates	20	1	16	6	4	2	16	23	8	18	8	19	29	4	5	364	8
Yemen	7	0	8	1	1	4	0	7	2	11	1	12	6	1	0	8	40

partnership between the countries in their publication. For example from Bahrain publications, 197 cases have been published by contribution of only internal researchers and academic members of Bahrain scientific centers. Red marked zeros refer to situations in which, there were no any joint contribution for common publications between two countries that have been indicated in the top of leading rows. Each of other numbers refers to the contribution of two affiliated countries.

**Subject area of publications**

In overall, in global level, most of obesity/overweight papers published in the field of Medicine (76.7%), after that, the highest proportion of publications respectively, belonged to, biochemistry (23.3%), and agricultural and biological sciences (12%). In Iran, publications approximately follow this distribution. Considering the results, 64% of Iranian papers were completely related to medicine, 11% were published in the field of biochemistry, Genetics and molecular biology, and 6% were aligned to the fields of agricultural and biological sciences. Figure 3 compares the distribution of publications' subject area of obesity/overweight publications at national, regional and global levels.

**Institutions/journals**

Considering the role of universities or other scientific institutes in publication of obesity/overweight papers; the first three effective institutes with the most publications are; VA Medical Center, Brigham and Woman's' Hospital, and Inserm, respectively with 1.25%, 0.81%, and 0.78% of global participation in knowledge production. Harvard School of public Health with insignificant difference is the fourth producing center of obesity publications (3,154 papers, 0.87%).

In Iran, Tehran University of Medical Sciences was responsible for 27% of related publications. After that, Shahid Beheshti University of Medical sciences counterpart in 15% of knowledge productions. The third rank belonged to Isfahan University of Medical sciences (14% contribution) [Figure 4].

Regarding the sources of publications in global level, the three first journals are; International Journal of Obesity (5396; 1.30%), PLoS one (4280; 1.03%), and obesity surgery (4033; 0.99%).

In Iran, Iranian Journal of Endocrinology and Metabolism, Journal of Research in Medical Sciences, and Archives of Iranian Medicine, respectively with 3.47%, 2.78%, and 2.19% of national publication contribution, were the top three sources of obesity-related publication.

**Articles type**

During this period, the most prevalent type of obesity-related publications' was original articles that consist 90% of all knowledge products. After these review

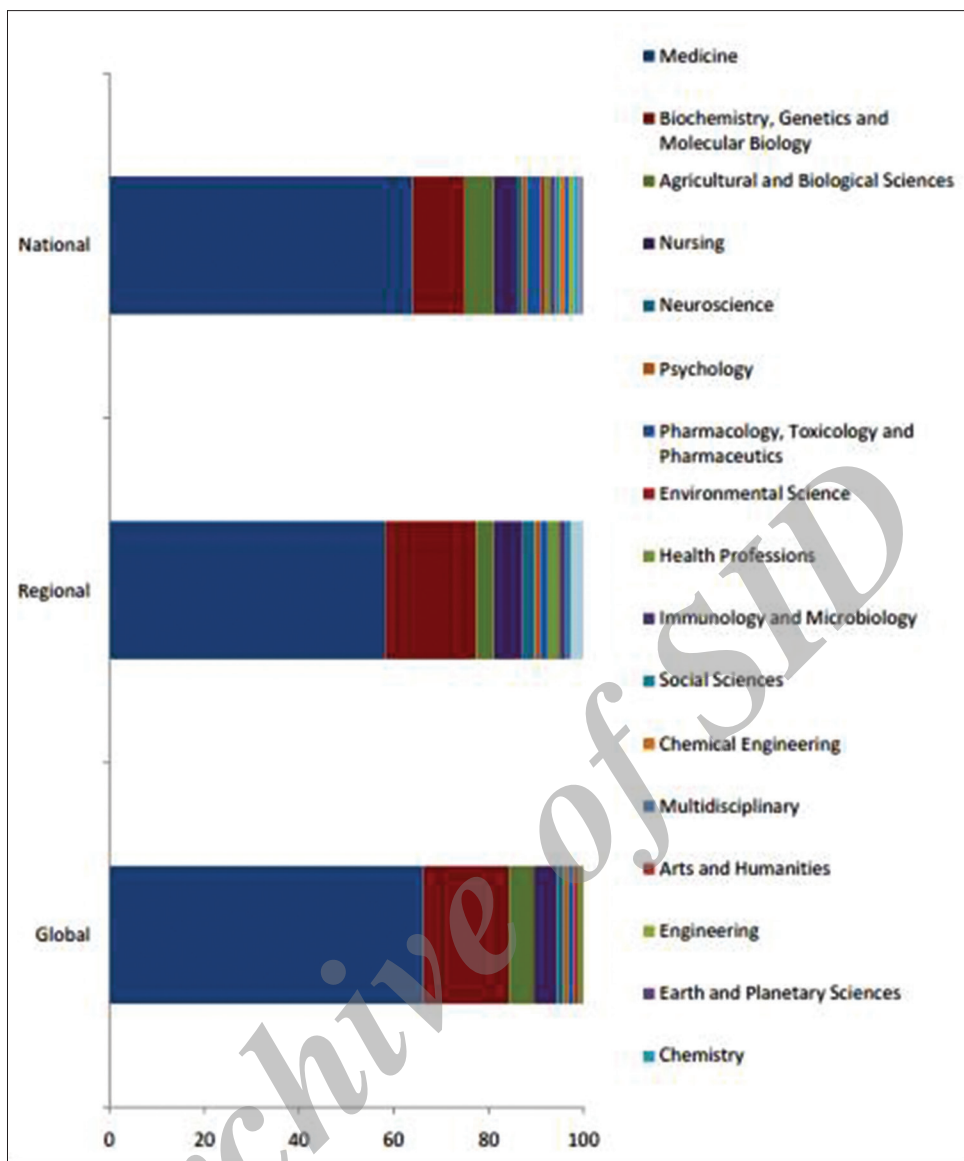


Figure 3: The distribution of subject area of obesity/overweight publication at national, regional and global levels

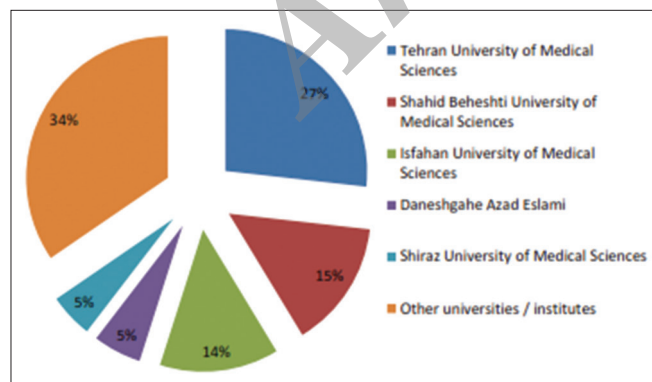


Figure 4: Contribution of national universities/scientific institutes in publication of obesity/overweight papers, 1990-2013

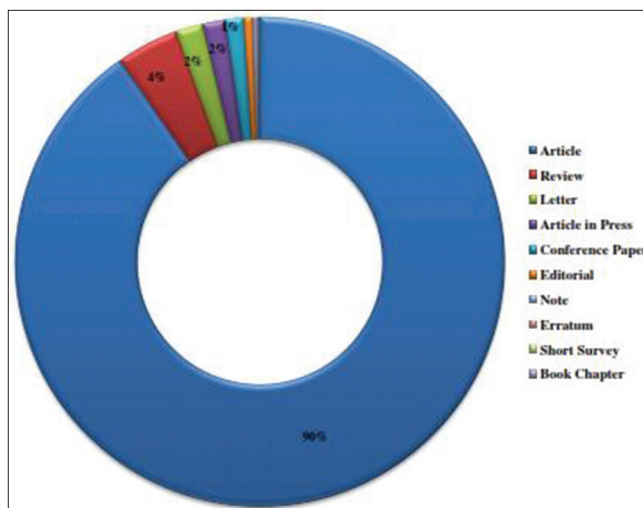


Figure 5: The national distribution of article type

articles (4%) and letters (2%) set on next levels. Figure 5 shows the distribution of article type.

## DISCUSSION

The results of the present study verify Iran's position in obesity/overweight publications between other Middle East countries'. Scientific evidences have emphasized that overweight and obesity become one of the most important health priority, with increasing trends, which need special attention and quick response.<sup>[2-4]</sup> Designing and implementation of these preventive or controlling programs require to accurate information and scientific evidences that have provided through scientific papers and reports.<sup>[6,9,11]</sup>

Scientometric indicators such as "number of papers", "number of citations" have become increasingly important as instruments for analyzing scientific activities and their relationship with economic and social development. They can appraise the performance and improvement of national science and technology.<sup>[13]</sup>

Based on the Iran's 20-year national vision document, Iran is pictured as the highest developed country in science/technology by 2025.<sup>[19]</sup> Considering that, Iran follow one of the fastest growth rates in scientific production in the whole world.<sup>[20]</sup> Iran has experienced a considerable growth in obesity/overweight publications. Compare with other countries in the regions, after Turkey and Israel, respectively with 7,092 and 5,214 papers, Iran has achieved to third position with 3,886 papers. Citation as one of the representative indexes for paper's application and quality, in most of region countries', has ascending pattern. In a closer inspection, the index of citation per paper needs more attention.

These recent rapid increasing trends in research outputs can be attributed to the attention to research by country policy-makers up to the highest level of leadership that has caused a national comprehensive commitment on research policy, facilities, and resources.<sup>[21-23]</sup>

Obesity/overweight researches' increasingly involves multidisciplinary collaboration, sometimes across multiple organizations.<sup>[24]</sup> These collaborations, potentially, provide more facilities for increasing the citations and applications of papers.<sup>[25,26]</sup> Israel between the region countries had the most citation for obesity-related papers that is directly associated with its higher rate of collaborative papers. In this regard, after Turkey, Iran had the third ranks of high citation order. Between out of regions countries, USA had the most participation in the publication of all 17 Middle East countries. Inside the region, Saudi Arabia and Egypt with 145 collaborative papers had the first collaborative position. Cyprus had the lithest collaborative papers. In the field of obesity/overweight, Iran had the most collaborative papers respectively with USA (4.6%), UK (3.6%), and Canada (1.7%). Between region countries, the most collaborative papers were published in Turkey.

The increase in the number of related multidisciplinary faculties as well as research centers and consequently the increase of related specialists, students, research projects, and dissertations are inevitably positive factors which influence the rise in the number and citations of papers in this field.<sup>[22,27,28]</sup>

Our study benefited from many strength points. First, we focused on specific obesity/overweight domain to clarify the exact situation of knowledge production. Second, we use the most comprehensive conational international database for the most coverage. Third, we assessed collaboration between Middle East countries in related research fields; and fourth, we explain the situation of Iran as one of the most effective knowledge productive country in the region in details. We also faced with some limitation in multidisciplinary subject category.

## CONCLUSIONS

To the best of our knowledge, this is the first scientometrics analyses of obesity/overweight knowledge productions in the Middle East region countries that provide practical information for better research planning in related multidisciplinary fields. Despite the ascending trends in research outputs, more efforts required for promotion of collaborative partnerships. These results also could be useful for better health policy and more planned studies in this field.

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