



A Bibliometric Study of Scientific Literature on Obesity Research in Web of Science Database (2008-2020): Evidence from the MENA Region

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Abstract

Background: Obesity has increasingly become a health threat in the Middle East and North Africa (MENA) countries. This study aimed to investigate the scientific publications on obesity in the MENA countries during 2008-2020.

Methods: A longitudinal analysis of 13 years (2008-2020) of bibliographic data from obesity-related articles was performed. Web of Science core collection (WoS) was searched for bibliographic data. The bibliometric indicators including overall productivity and collaboration along with the prevalence of obesity and socioeconomic status were used to assess and compare the context of obesity research efforts in the MENA region.

Results: The overall obesity-related articles of the MENA countries cumulated to 23680 publications. The MENA region accounted for a 6.5% global publication share in obesity research. Turkey contributed the highest rate of total publications (n=6162) followed by Iran (n=5302) and Israel (n=2847). Iran and Turkey had the lowest rates of international collaborations. The overall obesity research was not significantly associated with socio-demographic index (SDI) measure ($r=-0.26$, $P=0.27$). No significant association was found between Gross National Income (GNI) per capita and the overall production of obesity research ($r=0.41$, $P=0.08$). Additionally, obesity research was not significantly associated with the prevalence of obesity in the countries ($r=0.24$, $P=0.30$).

Conclusion: This study observed an increased share of scientific productivity in the field of obesity from the MENA countries. Neither SDI, GNI per capita, nor obesity prevalence was not significantly associated with the overall productivity of the region.

Keywords: Bibliometric study; Obesity; Overweight; Middle East; North Africa

Introduction

Obesity has increasingly become a health threat worldwide. Globally, in 2016, 39% of adults were

overweight and 13% were obese (1). The rising slope of overweight and obesity prevalence is



even more accelerated in the Middle East (2). Previous studies have reported overweight and obesity prevalence in the Middle East and North Africa (MENA) region as high as 40% (3). In Turkey, the obesity rate has been doubled from 1990 to 2010 (4). Recent data obtained during the National Survey of Risk Factors of Non-Communicable Diseases (SURFNCD 2016) reported that about 22.7% of the Iranian adult population were obese and 59.3% were overweight/obese (5).

Along with the obesity pandemic, there has been a significant increase in scientific publications on obesity and its related consequences (6). One recent bibliometric study found that globally, more than 50000 obesity-related articles were published during 1999-2017 (7). Accordingly, in the MENA region, overweight/obesity-related articles have shown a significant increase in recent decades. Namely, total publication and the total number of citations by each country in the region have had a rising trend (8). Citations of papers is an index that typically is used as a proxy of the application of papers. The collaboration in research conduct and papers publication and collaborative research centers consider as other citation indices (8,9).

While the above-mentioned parameters show overall scientific productivity, the whole picture of obesity-related publication is incomplete unless the obesity prevalence and socioeconomic status of each country are considered. Gross national income (GNI) and socio-demographic index (SDI) are frequently used to provide the socioeconomic status of countries. The MENA countries are diverse in terms of GNI. In 2013, GNI per capita ranged from 6109 USD in the lower-middle-income countries to 67657 USD in the high-income states.

Regarding the significant discrepancy between the socioeconomic indicators in the MENA countries and given the rapid growth of overweight/obesity-related consequences in the region in recent years, this study aims to investigate the scientific productivity on obesity considering obesity prevalence and socioeconomic status of the MENA countries from 2008 through 2020.

Methods

Data source

A longitudinal analysis of 13 years (2008-2020) of bibliographic data from obesity-related articles was performed. Web of Science core collection (WoS) was searched during July 2021 for bibliographic data. WoS is an online bibliographic multidisciplinary publication and citation database prepared by Clarivate and Analysis and covers over 20000 journal titles and 1.4 billion cited references going back to 1900 in the science, social sciences, and arts and humanities. This citation database was available through subscription and was accessed from the Iranian Ministry of Health and Medical Education. Articles published in 2021 were not included in the analysis, as the indexing procedure was not completed in WoS at the time of downloading. All languages and all document types were included in the analysis.

A comprehensive search strategy was developed by an expert librarian. The search strategy included the following entry terms in title, abstract, or keywords of articles: “overweight”, “obesity”, “abdominal obesity”, “bariatric surgery”, “visceral fat”, “subcutaneous fat”, “ectopic fat”, “cardiometabolic risk factors” and “obesity phenotype” with “OR” as the Boolean operator.

In the present study, the term MENA refers to the Middle East and North Africa region as defined by the World Bank. According to this definition, the following countries were included in the analysis: Algeria (DZA), Bahrain (BHR), Egypt (EGY), Iran (IRN), Iraq (IRQ), Israel (ISR), Jordan (JOR), Kuwait (KWT), Lebanon (LBN), Libya (LBY), Morocco (MAR), Oman (OMN), Qatar (QAT), Saudi Arabia (KSA), Syria (SYR), Tunisia (TUN), Turkey (TUR), United Arab Emirates (UAE), and Yemen (YEM).

Bibliometric indicators

The following bibliometric indicators were used to assess and compare the context of obesity research efforts in the MENA region.

Overall productivity

To assess the overall productivity and growth of obesity researches in included countries the fol-

lowing criteria were used: total publications, citation per publication, and average annual growth rate (AAGR). The AAGR was used to provide a better picture of changes in productivity. The AAGR measures the average growth of productivity across a series of equally spaced periods. Among the indicators, total publications and total citations were absolute numbers whereas AAGR and citation per publication were aggregated over different years for each country.

Collaboration

Total authors, authors per publication, and international collaborations were used to assess collaboration patterns at country or institutional levels. A paper was considered as having international collaborations if the authors affiliated from different countries. Author statistics were absolute numbers whereas the number of international collaborations was aggregated over all countries in the region.

Supplementary indicators

Prevalence of obesity

The prevalence of obesity among adults as estimated by Global Burden of Disease Study 2015 (GBD 2015) (10) was further added to the latter indicators to illustrate the overall prevalence of obesity in each country.

Socioeconomic indicators

Gross national income (GNI) per capita data were extracted from the World Bank Open Data for each country to indicate their economic status over the years (2008-2020). These data are available online through <http://data.worldbank.org/country>. Socio-demographic index (SDI) data were also extracted from the Global Burden of Disease Study for further analysis (11). SDI is a composite measure to identify the countries' development status rel-

evant to health, according to incomes per capita, average educational attainment, and fertility rates. SDI allows policymakers to compare countries according to their health status, and performance of health systems. According to SDI, countries are grouped across five levels including high SDI, high-middle SDI, middle SDI, low-middle SDI, and low SDI (12).

Statistical analysis

Descriptive statistics including frequencies were used for data summarization. Spearman correlation coefficient was used to investigate statistical associations among total publications and a range of socioeconomic indicators. A level of 0.05 was considered significant for a two-sided test. IBM SPSS software version 22.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis.

Results

The overall research productivity of MENA countries in the field of obesity cumulated to 22,167 publications during 2008-2020. The MENA region accounted for 6.5% of the global publication share in obesity research. The annual productivity of the region increased from 616 publications in the year 2008 to 3503 publications in the year 2020. The average productivity growth of MENA countries was about 12.37 over the course of 13 years. The average citation impact of MENA productivity on obesity research was estimated at 25.84 citations per publication. Of the total productivity, 80.3% (n = 17,810) was published as original articles, 9.5% (n = 2,112) as reviews, 6.4% (n = 1,411) as meeting abstracts, 1.6% (n = 351) as proceedings paper and 1.6% (n = 354) as letters. Figure 1 illustrates the year-wise publication and citation patterns of the top MENA countries in obesity research.

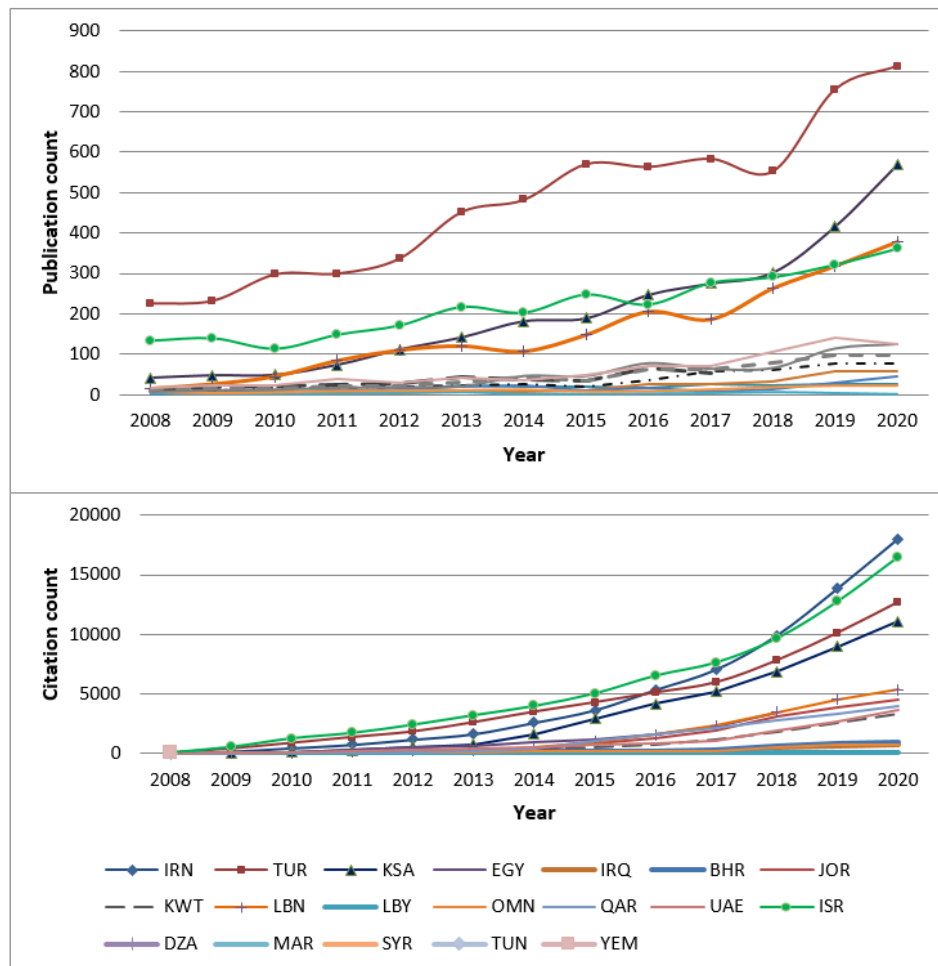


Fig. 1: Publication and citation patterns of MENA countries in obesity research during 2008-2020.

DZA, Algeria; BHR, Bahrain; EGY, Egypt; IRN, Iran; IRQ, Iraq; ISR, Israel; JOR, Jordan; KWT, Kuwait; LBN, Lebanon; LBY, Libya; MAR, Morocco; OMN, Oman; QAT, Qatar; KSA, Saudi Arabia; SYR, Syria; TUN, Tunisia; TUR, Turkey; UAE, United Arab Emirates; YEM, Yemen

The overall productivity of MENA countries according to some bibliometric indicators was reported in Appendix 1 (Not published. Readers may contact authors if needed). According to this data, Turkey contributed the highest rate of total publications (n=6162) followed by Iran (n=5302) and Israel (n=2847). However, Yemen, Algeria, and Jordan represented higher levels of average citation impact among MENA countries with 68.2%, 44.2%, and 41.6%, respectively. In terms of AAGR, Syria represented an outstanding growth of 62.9% per annum, followed far behind by Bahrain and Algeria with 61.8% and 59.4%, respectively. Yemen was the leading country in

terms of “author per publication”, suggesting an average of 41.8 authors across the study period. Algeria (11.8) and Morocco (10.4) were the next two countries with higher collaboration rates. Yemen, Algeria, Bahrain, and Oman were the leading countries in terms of international collaborations. However, Iran and Turkey indicated the lowest rates of international collaborations among MENA countries (Appendix 1). Uneven growth was evident over the study period (Fig. 2). The annual international collaboration of MENA increased from 44.15% in the year 2008 to 72.64% in the year 2020.

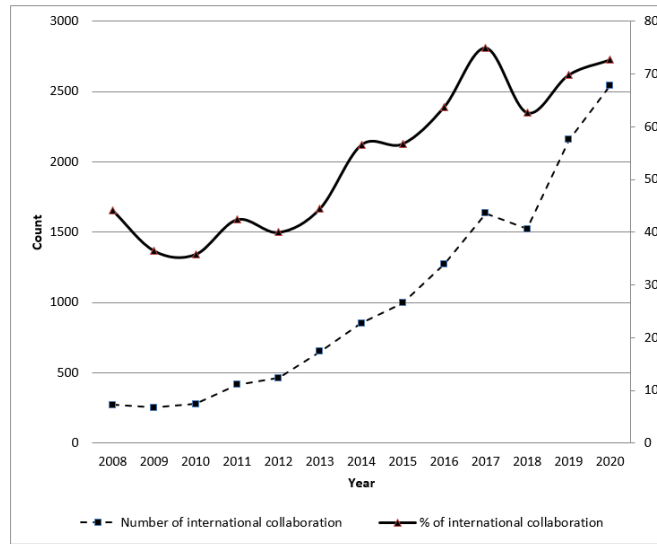


Fig. 2: Year-wise international collaborations (right axis) and percentages (left axis) (in terms of total publications) in the MENA region during 2008-2020

Further investigations indicated the great share of publications among countries with high-middle SDI and upper-middle-income countries (Fig. 3). According to this figure, the overall production of upper-middle-income countries was increased from 242 in 2008 to 1046 in 2020.



Fig. 3: Publication patterns of MENA countries in obesity research during 2008-2020, according to GNI per capita levels (A) and SDI (B)

More inspection of available data indicated that the overall obesity research was not significantly associated with SDI measures ($r = -0.26$, $P = 0.27$). No significant association was found between GNI per capita and the overall production of obesity research ($r = 0.41$, $P = 0.08$). Additionally, obesity research was not significantly associated with the prevalence of obesity in the countries ($r = 0.24$, $P = 0.30$).

Discussion

The present study demonstrated the status of scientific productivity on obesity in the MENA region during the years 2008-2020. While there was a steep increase in overall productivity, the region accounted for 6.5% of global publications in this field.

One previous study reported the MENA area's share as 1.8% of worldwide obesity researches in the years 1988-2007 (6). Djalalian et al., reporting 24 years, found the share of Middle East countries as 3.56% during the years 1990-2013 (8). In our study, among MENA countries, Turkey, Iran, and Israel had the highest rate of total publications, respectively. In terms of citation impact, Yemen, Algeria, and Jordan presented higher rates of citation per annum. Accordingly, biomedical productions of Arab countries in the region lagged other Middle Eastern countries – even when adjusted for population, GNI, and GNI per capita (13).

Overweight and obesity become one of the most important health priorities, with rising trends, which require special attention and quick response (14). Designing and implementation of these preventive or controlling programs need to accurate information and scientific evidence that have provided by scientific papers and reports (15).

Scientometric indicators including “number of papers”, and “number of citations” have become increasingly important as instruments for analyzing scientific activities and their association with economic and social development. They can

evaluate the performance and improvement of national science and technology (16).

Citation as one of the representative indices for paper's application and quality, in most of the region countries', has ascending pattern. In a closer inspection, the index of citation per paper requires more attention.

While bibliometric indicators provide some information on the status of overweight/obesity-related researches in the region, the picture would not be complete unless considering other aspects that might affect this issue. It has been controversies regarding the association between socioeconomic indices and the prevalence of obesity. While in the developing countries (6), obesity is not necessarily a disease of people with higher socioeconomic status, a more recent investigation showed that there is a positive correlation between economic status and prevalence of obesity in the middle-east region (3). Among the high-income states, Kuwait has the highest level of obesity. A recent study reported that from every 10 Kuwaiti adults almost 8 were overweight or obese (17). Our study showed a great share of publications among countries with high-middle SDI and upper-middle-income countries. We found no statistically significant relationship between obesity prevalence and GNI per capita and total publication in the region.

These recent rapidly increasing trends in research productivity can be attributed to the attention to research by country policy-makers up to the highest level of leadership that has resulted to a national comprehensive commitment to research policy, facilities, and resources (18,19).

Overweight/obesity research increasingly involves multidisciplinary collaboration, sometimes across several organizations (20). These collaborations, potentially, provide more facilities for elevating the citations and applications of papers (21,22). Israel between the region countries had the most citation for obesity-associated papers that are directly related to its higher rate of collaborative papers. In this regard, after Turkey, Iran had the third rank of high citation order. Among 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 lightest collaborative papers.

The increase in the number of associated multi-disciplinary faculties as well as research centers and consequently the elevate of related specialists, students, research projects, and dissertations are inevitably positive factors that affect the rise in the number and citations of papers in this field (18,23).

To the best of our knowledge, this is the first study that has examined bibliometric indicators in the field of obesity along with obesity prevalence and socio-economic status of MENA countries. Moreover, we have used a comprehensive list of keywords relating to overweight and obesity to determine our search strategy. In addition, using the WoS database allowed us to perform a comprehensive analysis of obesity research production and impact across MENA countries. However, our findings should be viewed in the context of our limitations. First, our search strategy was confined to the keywords in the English language. Thereby, scientific products categorized under keywords in other languages might have not been accounted for. Second, when assessing each country's share of productivity, we could not exclude articles related to multinational collaborations. Thus, our findings on international collaboration should be interpreted with caution.

Conclusion

This study found an increased share of scientific productivity in the field of obesity from the MENA countries in the years 2008-2020. The leading states were Turkey, Iran, and Israel. Considering diverse socioeconomic status in the region, our findings showed no statistically significant relationship between GNI per capita and total publication. In addition, the SDI measure was not significantly correlated with scientific productivity on obesity. Considering the rising trend of overweight/obesity in the region, there

is a need for further quality researches addressing the obesity problem in the MENA countries.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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