Original Article

ANATOLIAN CURRENT MEDICAL

DOI: 10.38053/acmj.1083617

Anatolian Curr Med J 2022; 4(3); 223-227

# Ramadan and health: a scientometric analysis of health literature on Ramadan and fasting

Fatih Eskin[1], Engin Şenel[2]

[1]Hitit University Faculty of Medicine, Departments of Internal Medicine, Çorum, Turkey
[2]Hitit University Faculty of Medicine, Departments of Dermatology and Venereology, Çorum, Turkey

**Cite this article as**: Eskin F, Şenel E. Ramadan and health: a scientometric analysis of health literature on Ramadan and fasting. Anatolian Curr Med J 2022; 4(3); 223-227.

## ABSTRACT

**Aim:** During Ramadan month, every year, approximately two billion of Muslims practice fasting and avoid eating, drinking and intercourse from dawn to dusk throughout the world. Although the effects of Ramadan fasting on human health were highly studied in academic literature, there are only limited number of scientometric articles referring to Ramadan and health.

**Material and Method:** We performed a scientometric analysis of "Ramadan and health" publications indexed in Web of Science databases between 1980 and 2019 and found a total of 497 articles.

**Results:** The most published documents were original articles (88.13%). The most studies areas were found to be Religion, Nutrition and Endocrinology, (n=269, 214 and 184 items, respectively). The USA was leading country with 76 items followed by Saudi Arabia, the UK, Turkey and Iran (n=76, 58, 55, 39 and 36 papers, respectively). King Saud University (Saudi Arabia) ranked first in institutions with 21 items. H-index of Ramadan and health literature was measured as 40 and total number of citations was 5837. The most indexed keywords were "Ramadan", "fasting", "diabetes", and "pregnancy". The USA, the UK, Saudi Arabia and Canada were found as the most collaborative countries.

**Conclusion**: The importance of scientometric studies has been increasing in recent years. We think that this scientometric study data about Ramadan and fasting which are the conditions of the religion of Islam will contribute to scientists.

**Keywords:** Ramadan, health, fasting, scientometrics, bibliometrics

## INTRODUCTION

Diurnal fasting for a limited number of days is ordained in Islam and Judaism in Abrahamic religions. In Islam, fasting during the month of Ramadan was fundamentally ordered for Muslims according to the surah al-Baqarah verse 183-184 in Holy Quran (1). During Ramadan month, every year, nearly two billion of Muslims practice Ramadan fasting and abstain from eating, drinking and intercourse from dawn to sunset throughout the world (2). Scientometrics is a statistical discipline evaluating academic literature in a certain field (3). Although the effects of Ramadan fasting on human health were highly investigated in academic literature, there are only limited number of scientometric articles referring to Ramadan and health.

## MATERIAL AND METHOD

Ethics committee approval was not required for the preparation of the article. Institutional approval was obtained for the preparation of the article.

We analyzed all articles in the literature of Ramadan and health indexed in Web of Science (WoS, Clarivate analytics, USA) databases titled Core Collection, SciELO Citation Index, Russian Science Citation Index and Korean Journal Database. All papers published between 1980 and 2019 were included in our analysis. A search string containing keywords of "Ramadan" and "health" were used for our scientometric search. A free web source named GunnMap 2 was used to generate global productivity map in academic literature (4).

**Corresponding Author**: Fatih Eskin, fatiheskin@hotmail.com

**Received:** 06.03.2022 **Accepted:** 25.03.2022

Scientometric network images were created with a free software tool titled VOSviewer (version 1.6.7, Copyright Centre for Science and Technology Studies, Leiden University, The Netherlands) (5).

## RESULTS

### General features

Our search yielded 497 articles and only 35.61% of which were open access. Main language of the literature was English (96.98%) followed by French, Arabic, Spanish and German (3.22, 1.61, 1.61 and 0.4%, respectively). Original articles covered 88.13% of all literature (**Table 1**). The most studies areas were found to be Religion, Nutrition, Endocrinology, Psychology and Health Care (n=269, 214, 184, 178 and 150 documents, respectively; **Table 2**). The peak year of the literature was 2019 with 73 items. 1982 was the first year that articles published in this area (**Figure 1**). The first original article in Ramadan and health literature was titled "Changes in certain blood-constituents during Ramadan" written by Fedail SS et al. (6) and published in American Journal of Clinical Nutrition.

**Table 1.** Types of documents published on health literature pertaining to Ramadan and health*

| Document type | Number | %a |
|---|---|---|
| Original article | 438 | 88.129 |
| Review | 68 | 13.682 |
| Meeting report | 47 | 9.457 |
| Abstract | 35 | 7.042 |
| Editorial material | 20 | 4.024 |
| Letter | 14 | 2.817 |
| Clinical trial | 11 | 2.213 |
| Other/Unspecified | 9 | 1.811 |
| Case report | 4 | 0.805 |
| Book | 2 | 0.402 |
| Biography | 1 | 0.201 |
| Total | 497 | 100 |

**Table 2.** The top ten research areas of documents in Ramadan and health literature according to Web of Science database between 1980 and 2019

| Research Areas | Number of publications | % |
|---|---|---|
| Religion | 269 | 54.125 |
| Nutrition/Dietetics | 214 | 43.058 |
| Endocrinology | 184 | 37.022 |
| Psychology | 178 | 35.815 |
| Health Care | 150 | 30.181 |
| Environmental/Occupational Health | 145 | 29.175 |
| Behavioral Sciences | 141 | 28.370 |
| Pathology | 127 | 25.553 |
| Internal Medicine | 119 | 23.944 |
| Pharmacology | 116 | 23.340 |

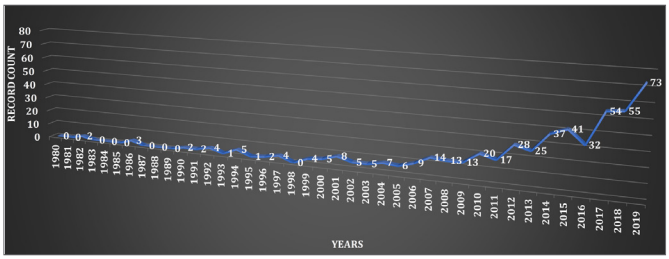


**Figure 1.** Record count of Ramadan and health literature by year

### Countries, authors, institutions and source titles

The most contributor countries were the United States of America (USA), Saudi Arabia, the United Kingdom (UK), Turkey and Iran (n=76, 58, 55, 39 and 36 documents, respectively; **Figure 2**). Publications were distributed to 61 countries (**Figure 3**). The most prolific author was Hassanein M with 10 articles from University of Leicester (UK) (**Table 3**). King Saud University (Saudi Arabia) was the leading institution with 21 items (**Table 4**). The most productive journal in this field were Diabetes Research and Clinical Practice, Journal of The Pakistan Medical Association and Journal of Sports Sciences (4.22, 2.21 and 1.81%, respectively; **Table 5**). According to WoS Core Collection, top ten funding agencies were German Research Foundation (Germany), National Institutes of Health (USA) and The United States Department of Health & Human Services (USA).

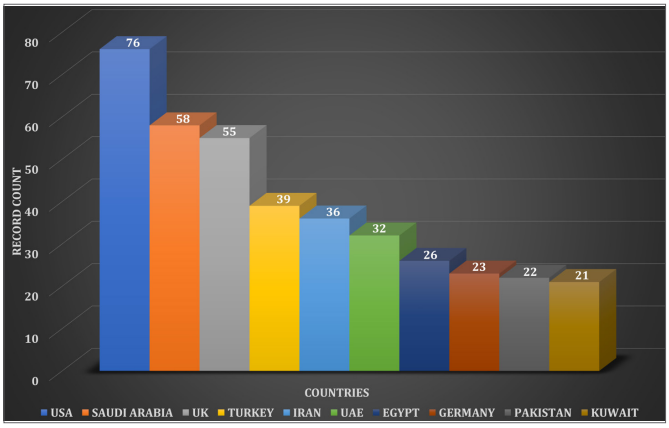


**Figure 2.** Top ten countries producing articles in Ramadan and health field by total record count

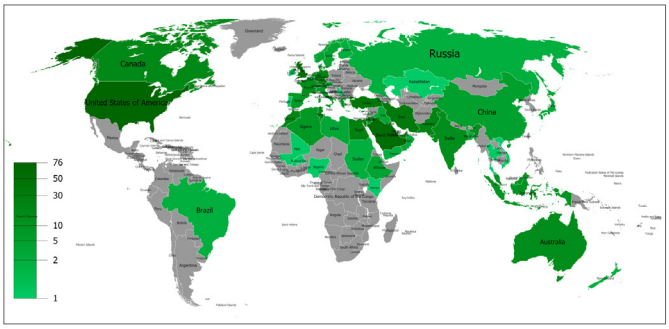


**Figure 3.** Global productivity in Ramadan and health literature

**Table 3.** The most prolific authors by record count in Ramadan and health literature

| Author | Institution | Country | Record Count | %* |
|---|---|---|---|---|
| Hassanein M | University of Leicester | UK | 10 | 2.012 |
| Dvorak J | Schulthess Klinik | Switzerland | 7 | 1.408 |
| Van Ewijk R | Gutenberg University | Germany | 7 | 1.408 |
| Beshyah SA | Dubai Medical College | UAE | 6 | 1.207 |
| Bragazzi NL | Genoa University | Italy | 6 | 1.207 |
| Chamari K | AHP Research Center | Qatar | 6 | 1.207 |
| Maughan RJ | Loughborough University | UK | 6 | 1.207 |
| Wilbur K | Qatar University | Qatar | 6 | 1.207 |
| Zerguini Y | FIFA Medical Center of Excellence | Algeria | 6 | 1.207 |
| Leiper JB | Loughborough University | UK | 5 | 1.004 |

**Table 4.** The top ten institutions by number of publications in literature of Ramadan and health literature

| Organizations | Country | Document number | % |
|---|---|---|---|
| King Saud University | Saudi Arabia | 21 | 4.217 |
| Aspetar Orthopaedic Sports Medicine Hospital | Qatar | 11 | 2.209 |
| Dubai Hospital | UAE | 11 | 2.209 |
| King Abdulaziz University | Saudi Arabia | 11 | 2.209 |
| United Arab Emirates University | UAE | 11 | 2.209 |
| Harvard University | USA | 10 | 2.008 |
| Johannes Gutenberg University of Mainz | Germany | 10 | 2.008 |
| Kuwait University | Kuwait | 10 | 2.008 |
| University of Hassan II Casablanca | Morocco | 8 | 1.606 |
| Sackler Faculty of Medicine | Israel | 8 | 1.606 |

**Table 5.** The first ten source titles according to the number of published documents in the literature of Ramadan and health

| Journal Name | Number of Publications | % |
|---|---|---|
| Diabetes Research and Clinical Practice | 21 | 4.217 |
| Journal of The Pakistan Medical Association | 11 | 2.209 |
| Journal of Sports Sciences | 9 | 1.807 |
| Saudi Medical Journal | 8 | 1.606 |
| International Journal of Clinical Pharmacy | 7 | 1.406 |
| American Journal of Epidemiology | 6 | 1.205 |
| Annals of Nutrition and Metabolism | 6 | 1.205 |
| Diabetes | 6 | 1.205 |
| Eastern Mediterranean Health Journal | 6 | 1.205 |
| Nutrients | 6 | 1.205 |

## Citation report

H-index of Ramadan and health literature was measured as 40 and total number of citations was 5837 (4356 without self-citations). Average citations per item were calculated as 11.72. The peak year was 2019 with 929 citations. The most cited manuscript was an original article investigating relation between diurnal fasting in Ramadan and fetal health, titled "Health Capital and the Prenatal Environment: The Effect of Ramadan Observance During Pregnancy" published in 2011 (7) (**Table 6**).

**Table 6.** The ten most cited manuscripts in the literature of Ramadan and health

| Article | Author | Journal name/published | Total citation | Average citations per year |
|---|---|---|---|---|
| Health capital and the prenatal environment: the effect of ramadan observance during pregnancy | Almond, Douglas; Mazumder, Bhashkar | American Economic Journal-Applied Economics | 154 | 15.40 |
| Effects on health of fluid restriction during fasting in Ramadan | Leiper, JB; Molla, AM; Molla, AM | European Journal of Clinical Nutrition | 127 | 7.06 |
| A controlled trial of reduced meal frequency without caloric restriction in healthy, normal-weight, middle-aged adults | Stote, Kim S.; Baer, David J.; Spears, Karen; et al. | American Journal of Clinical Nutrition | 124 | 8.86 |
| The impact of religious fasting on human health | Trepanowski, John F.; Bloomer, Richard J. | Nutrition Journal | 118 | 10.73 |
| Ramadan Education and Awareness in Diabetes (READ) programme for Muslims with Type 2 diabetes who fast during Ramadan | Bravis, V.; Hui, E.; Salih, S.; et al. | Diabetic Medicine | 113 | 10.27 |
| Fenton's peroxidation and coagulation processes for the treatment of combined industrial and domestic wastewater | Badawy, M. I.; Ali, M. E. M. | Journal of Hazardous Materials | 111 | 7.40 |
| Physiological and chronobiological changes during Ramadan intermittent fasting | Roky, R; Houti, I; Moussamih, S; et al. | Annals of Nutrition and Metabolism | 108 | 6.35 |
| Impact of caloric and dietary restriction regimens on markers of health and longevity in humans and animals: a summary of available findings | Trepanowski, John F.; Canale, Robert E.; Marshall, Kate E.; et al. | Nutrition Journal | 103 | 10.30 |
| Daytime alertness, mood, psychomotor performances, and oral temperature during Ramadan intermittent fasting | Roky, R; Iraki, L; HajKhlifa, R; et al. | Annals of Nutrition and Metabolism | 93 | 4.43 |
| Diabetes and Ramadan: review of the literature | Benaji, B.; Mounib, N.; Roky, R.; et al. | Diabetes Research and Clinical Practice | 89 | 5.93 |

### Scientometric Network Analysis

The most indexed keywords were noted to be "Ramadan", "fasting", "diabetes", "pregnancy" and "Islam" (**Table 7**). Scientometric network map of the keywords revealed a flower pattern in which the keywords of "Ramadan" and "fasting" centered (**Figure 4**). The USA, the UK, Saudi Arabia, Canada and Germany were found to be the most cooperative countries (**Figure 5**). The most collaborative institutions in Ramadan and health literature were noted to be King Abdulaziz University (Saudi Arabia), University of Amsterdam (Netherlands), University of Genoa (Italy), Case Western Reserve University (USA) and Johannes Gutenberg University Mainz (Germany).

**Table 7**. Most used 20 keywords on the literature related to Ramadan and health literature

| Keyword (Total link strength) | |
|---|---|
| 1. Ramadan (389) | 11. Pharmacist (30) |
| 2. Fasting (323) | 12. Saudi Arabia (27) |
| 3. Diabetes (101) | 13. Sleep (27) |
| 4. Pregnancy (77) | 14. Caloric restriction (25) |
| 5. Islam (64) | 15. Adherence (24) |
| 6. Type 2 diabetes (58) | 16. Insulin (23) |
| 7. Hypoglycemia (44) | 17. Intermittent fasting (23) |
| 8. Nutrition (38) | 18. Blood pressure (22) |
| 9. Muslim (37) | 19. Diet (22) |
| 10. Quality of life (31) | 20. Oxidative stress (21) |

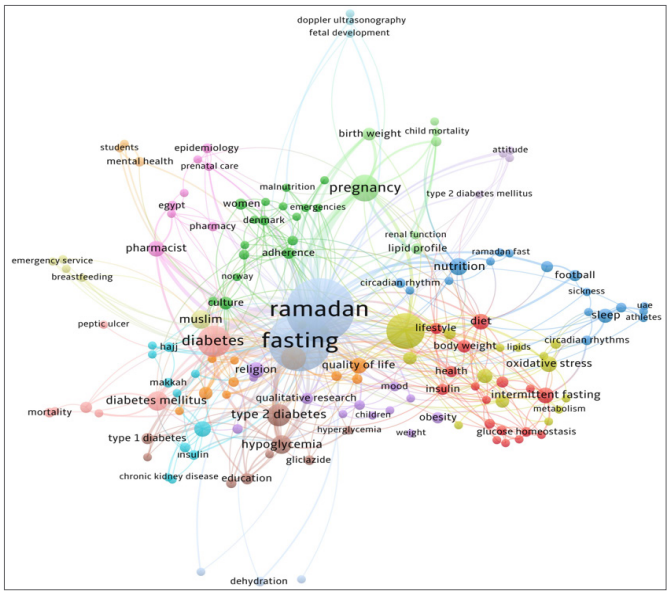


**Figure 4.** Scientometric network map of the most used keywords in Ramadan and health literature

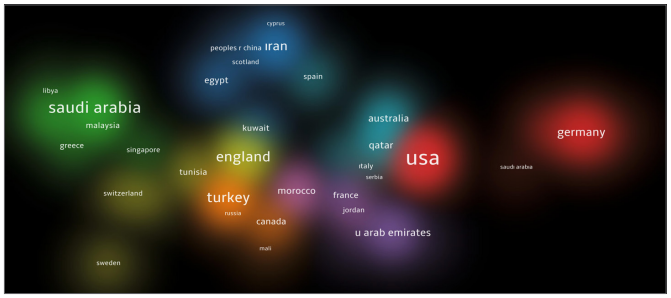


**Figure 5.** Scientometric map of the most collaborative countries in Ramadan and health literature

## DISCUSSION

Scientometrics also known as "science of science" is an in-depth assessment of various quantitative and qualitative aspects of scientific literature in a certain field. Although the first scientometric study in the literature was conducted by Campbell in 1896, popularity of scientometrics has been increased in the last decades (8). In 1969, Pritchard proposed the term of "bibliometrics" instead of "statistical bibliography" and since then both terms of scientometrics and bibliometrics have been used interchangeably (9).

Beshyah and Beshyah performed a bibliometric analysis of the literature on Ramadan fasting and diabetes by searching Scopus database for a period of 1989 to 2018. The found a total of 424 and 112 items were open access. Original articles were 67% of all documents and reviews were 15.1%. The percentage of original articles was noted higher in our study (88.13%). The authors found that the UK ranked first in the literature followed by Saudi Arabia although the USA stood out in our analysis. Imperial College London and associated institutions jointly with Hamad Medical Corporation of Qatar were the most contributor institutions related to Ramadan and diabetes literature (10).

Husain et al. performed a bibliometric analysis of top cited 100 articles on literature of Ramadan and health indexed in WoS databases. The UK ranked first in publication of the most cited 100 articles with 15 items followed by Turkey, Tunisia, Saudi Arabia and Iran (n=13, 12, 11 and 6 documents,

respectively). Interestingly, this study had no data of the most cited articles and therefore we could not extract any document title to compare the results of our analysis (11).

Nouira et al. reported a bibliometric study investigating Ramadan and health literature indexed in Medline (PubMed) database. A total of 508 documents from 38 countries were noted. English was main language and 94% of all items were original articles. Saudi Medical Journal which was the fourth most contributor journal in our analysis ranked first with 19 items in the Medline indexed literature of Ramadan and health. The UK had the most indexed publications with 146 documents although we found the USA was leading country in our analysis.

Our study has one limitation that we analyzed all documents in only one database. Since WoS is the world's most trusted publisher-dependent database including global publications and citations we decided to perform or scientometric study by using WoS databases (12,13).

## CONCLUSION

As a result, we think that other scientometric studies should be done in which articles written for Ramadan and some specific chronic diseases are evaluated.

## ETHICAL DECLARATION

**Ethics Committee Approval:** Ethics committee approval was not required for the preparation of the article. Institutional approval was obtained for the preparation of the article.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** All authors declare that they have no conflict of interest.

**Financial Disclosure:** There is no person/organization that supports the study financially and the authors do not have any interest-based relationship

**Author Contributions:** Eskin F: Project, development, manuscript reviewing, data collection, editing and revising Şenel E: Project, development, data collection and analysis, writing, editing and revising

## REFERENCES

1. Surah Al-Baqarah [2:183-193] - Al-Qur'an al-Kareem - القرآن الكريم [Internet]. [cited 2020 May 30]. Available from: https://quran.com/2/183-93
2. Khan MH, Al-Lehebi R. Respiratory disease and Ramadan. Lancet Respir Med 2020; 8: 449–50.
3. Şenel E. Health and ancient beliefs: A scientometric analysis of health literature related to Shamanism, Paganism and Spirituality. J Relig Health 2019; 58: 2019–35.
4. GunnMap. GunnMap 2 [Internet]. [cited 2020 Jan 10]. Available from: http://lert.co.nz/map/
5. Vosviewer. VOSviewer - Visualizing scientific landscapes [Internet]. [cited 2020 Jan 10]. Available from: https://www.vosviewer.com/
6. Fedail SS, Murphy D, Salih SY, Bolton CH, Harvey RF. Changes in certain blood constituents during Ramadan. Am J Clin Nutr 1982; 36: 350–3.
7. Almond D, Mazumder B. Health capital and the prenatal environment: The effect of Ramadan observance during pregnancy. Am Econ J Appl Econ 2011; 3: 56–85.
8. Hood WW, Wilson CS. The literature of bibliometrics, scientometrics, and informetrics. Scientometrics 2001; 52: 291–314.
9. Pritchard A. Statistical bibliography or bibliometrics? J Doc 1969; 25: 348–9.
10. Beshyah WS, Beshyah SA. Bibliometric analysis of the literature on Ramadan fasting and diabetes in the past three decades (1989–2018). Diabetes Res Clin Pract 2019; 151: 313–22.
11. Husain S, Zafar M, Ullah R. Ramadan and public health: A bibliometric analysis of top cited articles from 2004 to 2019. J Infect Public Health 2020; 13: 275–80.
12. Kendall S. LibGuides: PubMed, Web of Science, or Google Scholar? A behind-the-scenes guide for life scientists. : Which one is best: PubMed, Web of Science, or Google Scholar? [Internet]. [cited 2020 Mar 15]. Available from: https://libguides.lib.msu.edu/c.php?g=96972&p=627295
13. Trusted publisher-independent citation database - Web of Science Group [Internet]. [cited 2020 May 29]. Available from: https://clarivate.com/webofsciencegroup/solutions/web-of-science/