



Ramadan and public health: A bibliometric analysis of top cited articles from 2004 to 2019

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ABSTRACT

Objective: The present bibliometric study aimed to identify and perform the analysis of top one hundred cited publications on Ramadan fasting and health.

Methods: The Web of Science database was searched for publication analyses of the papers published from January 2004 till June 2019. The search was performed using keywords “Ramadan” AND “Health” OR “Fast*”. The descriptive analysis was performed using SPSS (version 20) software. The coauthor collaborations and keywords were analyzed using VOS viewer software (version 1.6.11).

Results: The present study found that the United Kingdom was the most productive country (n = 15) followed by Turkey (n = 13), Tunisia (n = 12) and Saudi Arabia (n = 11). The most prominent institution was National Center of Medicine and Science in Sports, Tunisia (n = 7) followed by King Saud University, Saudi Arabia (n = 6) and Loughborough University, United Kingdom (n = 5).

Conclusion: The most frequently occurring keywords in this analysis were Ramadan, fasting, exercise, Ramadan fasting and physical performance. The present study provides insight into the impactful papers pertaining to Ramadan fasting and associated health benefits.

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Introduction

The religions of the world are defined and characterized by different practices, set of beliefs and rituals. These practices are closely interlinked with cultures, historical, chronological and regional factors associated with their origin [1]. Many religions including Islam and Christianity have a belief system that seeks fortification of the mind and body through various behavioral and dietary modifications such as “fasting”. In fasting, an individual refrains from intake of drinks and food during a certain hours of a day. However, there is a great deal of variations in the practice and interpretation of fasting in different organized religions and ethnicities [2]. According to Islamic theology, during fasting, a practicing individual absolutely refrains from taking any food, drinks and medications from dawn to sunset. In addition, the fasting individual has to indulge in good

activities and refrain from evil deeds. Fasting in the holy month of Ramadan (29–30 days according to the lunar calendar) is one of the five pillars of the Islamic faith and obligatory for all adult Muslim men and women who are in a good state of health [3]. The duration of the fasting ranges from a few hours up to twenty hours depending on the season and geographical location [4].

Although individuals who are medically compromised, pregnant, breastfeeding, menstruating, traveling, elderly or having metabolic and other serious systemic derangements are exempted from fasting, millions of Muslims including a significant number of patients yearn to partake in the ritual of Ramadan fasting [4]. This may even be contrary to medical advice in many cases and affecting the general or systematic health of patients. Hence, there is a growing interest among the healthcare professionals to investigating the various aspects of human health during Ramadan [5,6]. A number of studies have reported variable findings with respect to the effects of Ramadan fasting on human health including body weight, metabolism and composition [7–9].

Considering the increase in number of studies pertaining to observed physiological and metabolic changes in the fasting state during Ramadan, a bibliometric analysis of these studies can be

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impactful. The science of bibliometrics is defined as the application of quantitative analytical techniques to the published literature including books and journal articles. Bibliometric analysis can be of immense value in terms of characterizing the current standing of various research based disciplines, pre-existing publication trends, scientific outputs of a researcher, institution, country and future research directions in that subject area [10]. In addition, the quality of relevant academic results and their evaluation is of great interest and relevance to the scientific community, academicians and policy makers placed in strategic posts in centers ranging from universities to ministries [11] that may potentially translate into a better policy and consolidation of knowledge in the scientific field. Bibliometrics is strategically positioned to achieve these goals by providing robust criteria for standardization of academic quality [12]. Considering these benefits, bibliometric analyses have been recently conducted in different specialties of medicine [13,14], dentistry [15–17] and various healthcare disciplines [18–20]. To the best of our knowledge, there is no quantification of research encompassing Ramadan fasting and various aspects of health. Therefore, the present bibliometric study aimed to identify and perform the analysis of top one hundred cited publications on Ramadan fasting and health.

Materials and methods

The top-cited articles pertaining to “Ramadan and health” were identified using the advanced search options of Web of Science (WoS) database (Clarivate analytics, USA). The articles published from January 2004 till June 2019 were searched using search terms: “Ramadan” AND “Health” OR “Fast*” in topics (Title, abstract and keywords). The search strategies were agreed upon after pilot searches by the investigators. The reviews and original articles were included however; documents such as meeting reports, abstracts, letters, editorials, book reviews, proceeding papers, corrections, notes, book chapters, and news items were excluded. In addition, articles in which the focus was not Ramadan fasting and health were also excluded.

Two investigators independently reviewed each article for inclusion or exclusion into the top 100 cited article list. In case of a lack of consensus, a third investigator resolved the disagreement about inclusion or exclusion of the article. The 100 most cited publications were selected, and the following parameters were identified and recorded in the SPSS database: Name of first author, country and institute of origin (based on first author affiliation), journals' name and impact factor (Journal citation report 2018 Clarivate analytics, USA), year of publication, total number of citations and average citations per annum since publication year, and type of study. The articles were ranked in a descending order according to the total number of citations; when two articles have similar number of citations, the recently published article was ranked higher. In case of more than one affiliation of the first author, first affiliation was recorded. Fig. 1 summarizes the methodology used in the present bibliometric study. The statistical package for social sciences SPSS version 20 (IBM Corporation, USA) was used for analyzing the data and presented in terms of frequencies in tabular and graphical forms. The VOS viewer software version 1.6.11 (Centre for Science and Technology Studies, Leiden University, Netherlands) was used to construct the collaborative networks among the authors and frequently occurring authors' keywords.

Results

The top cited articles on Ramadan and health according to citation count in descending order are listed in Appendix Table A. The

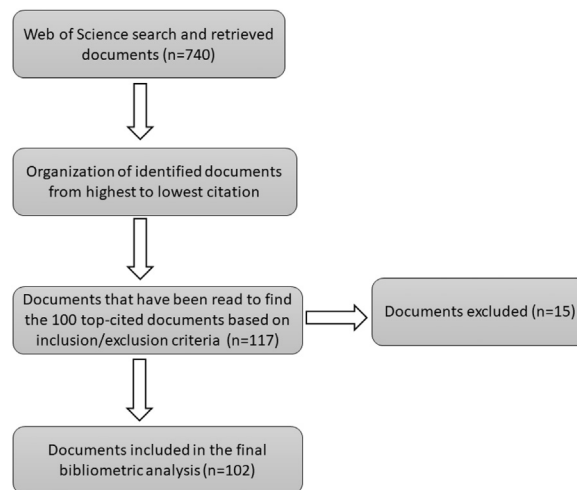


Fig. 1. Flow diagram of the methodology with number of records at each stage.

Table 1

Summary of various bibliometric parameters pertaining to Ramadan and health.

Descriptors	Frequency
Journal name (three or more paper published)	
<i>Journal of Sports Sciences</i>	8
<i>Saudi Medical Journal</i>	6
<i>Annals of Nutrition and Metabolism</i>	5
<i>International Journal of Clinical Practice</i>	5
<i>British Journal of Sports Medicine</i>	4
<i>Current Medical Research and Opinion</i>	4
<i>British Journal of Nutrition</i>	3
<i>Diabetes Research and Clinical Practice</i>	3
<i>Diabetic Medicine</i>	3
First author (three or more papers)	
Anis Chaouachi	5
Ahmed Bahammam	3
Jassim Al Suwaidi	3
Ronald J. Maughan	3
Study type	
Original research	83
Review	19
Total	102

top cited article [21] in the list received 256 citations and the last article [22] on the list received 18 citations. For each article, the average citation per year was provided alongside the total citations (Appendix Table A). During the evaluation of the research articles, there were fifteen articles with high citation counts but those were excluded because these are not relevant to Ramadan fasting and health (Appendix Table B).

Journals and publication years

The top 100 cited articles were published in numerous journals (n = 62). The journals with three or more publications among the top cited articles are listed in Table 1.

Majority of the top cited papers were published during the years 2008 (n = 17) and 2010 (n = 12) (Table 2).

Authors, countries and institutes

The most prominent first authors among the top cited author included Anis Chaouachi (n = 5), Ahmed Bahammam, Jassim Al Suwaidi and Ronald J. Maughan contributed equally (n = 3) (Table 1). Similarly, authors who have contributed extensively as co-author network are shown in (Fig. 2). The 100 top cited articles originated from 24 countries (Fig. 3); majority of the publications

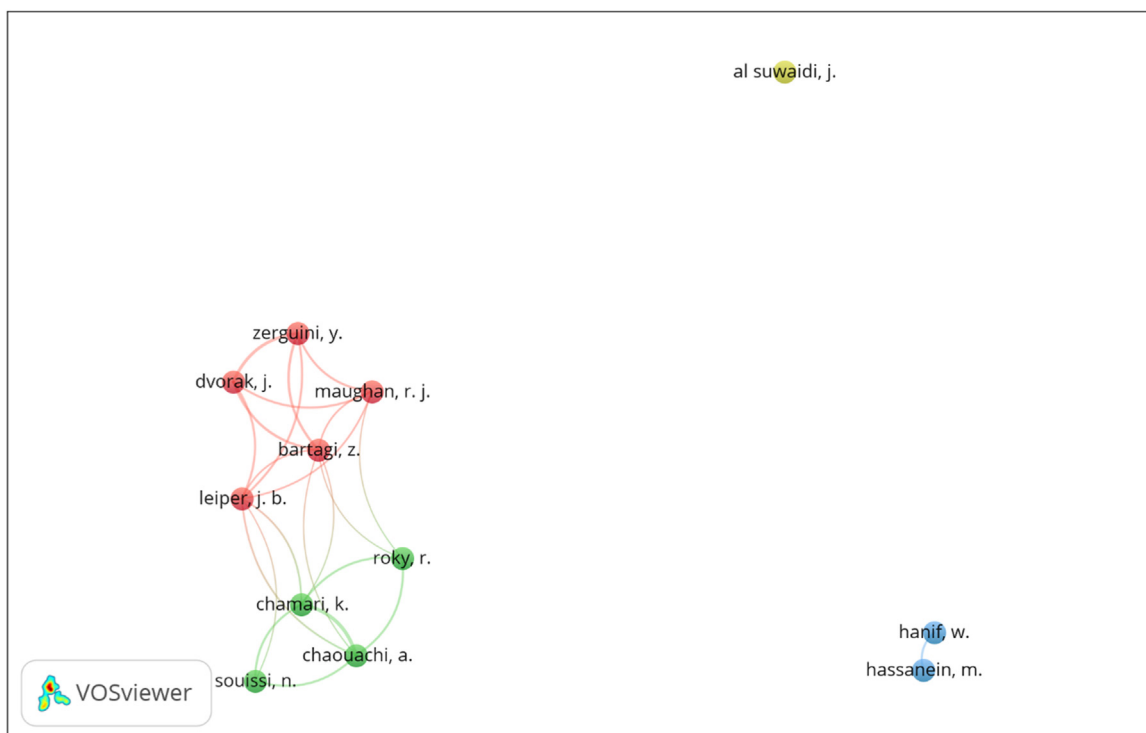


Fig. 2. Coauthor network minimum number of documents of each author were five.

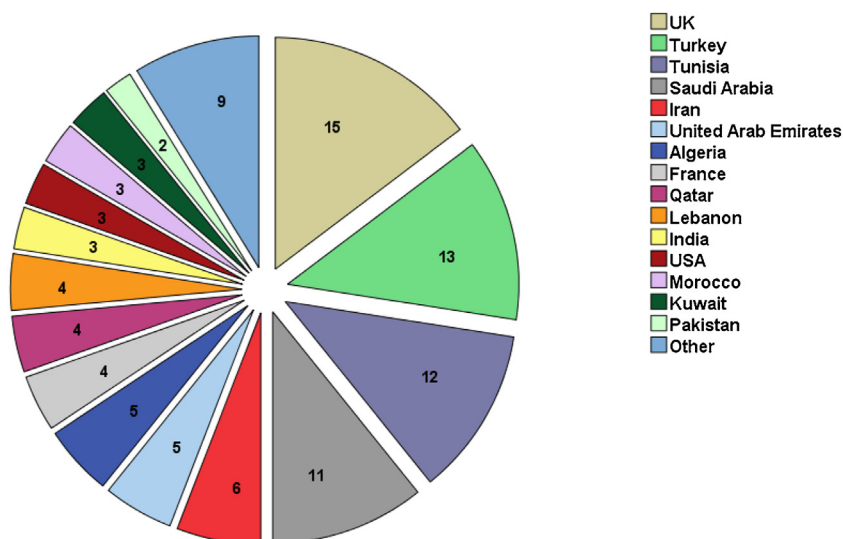


Fig. 3. Countries of origin of the 100 top-cited articles on Ramadan and health.

were from the UK ($n = 15$), Turkey ($n = 13$), Tunisia ($n = 12$) and Saudi Arabia ($n = 11$). The most prominent institutions that contributed to the top cited papers included “National Center of Medicine and Science in Sports” ($n = 7$), “King Saud University” ($n = 6$) and “Loughborough University” ($n = 5$) (Fig. 4).

Study type and keywords

The majority of the top cited paper are original studies ($n = 83$) followed by reviews ($n = 19$) (Table 1). The most frequently occurring authors’ keywords were analyzed. The more centrally placed and large sphere sizes indicated the most frequently occurring author keywords in the top cited papers (Fig. 5).

Discussion

The bibliometric analyses related to religion or religious practices and health are scarce and only limited number of bibliometric studies are published in the recent years [23–25]. The present study is the first of its kind to analyze the top cited articles pertaining to Ramadan fasting and associated health benefits. Although, it is beyond the scope of this article to review the findings of all studies presented in the top cited papers, we have briefly summarized the top three studies in this discussion. The first top cited article (256 citations) on the list was population based multi-country questionnaire survey to determine diabetic patient characteristics and assess their care [21]. The study further explores the diabetes presentation during Ramadan fasting and associated

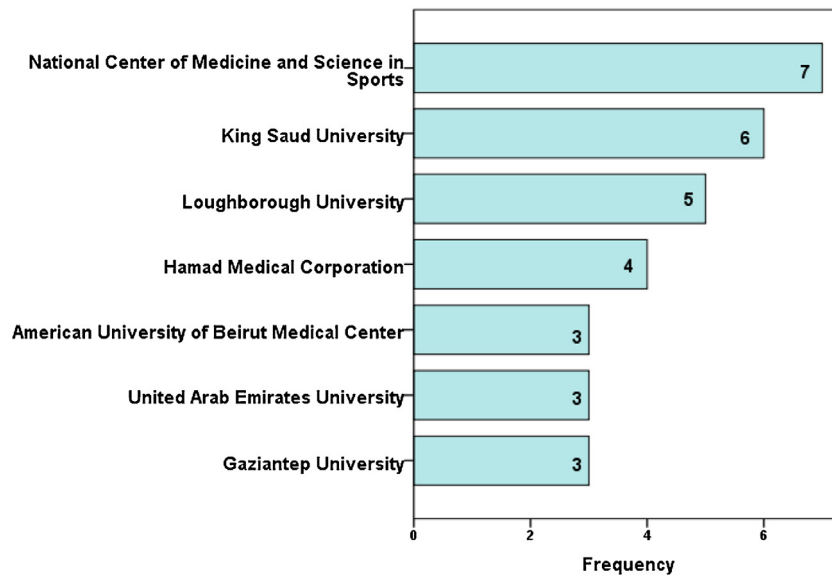


Fig. 4. Institutes with three or more publications contributing to the top-cited articles on Ramadan and health.

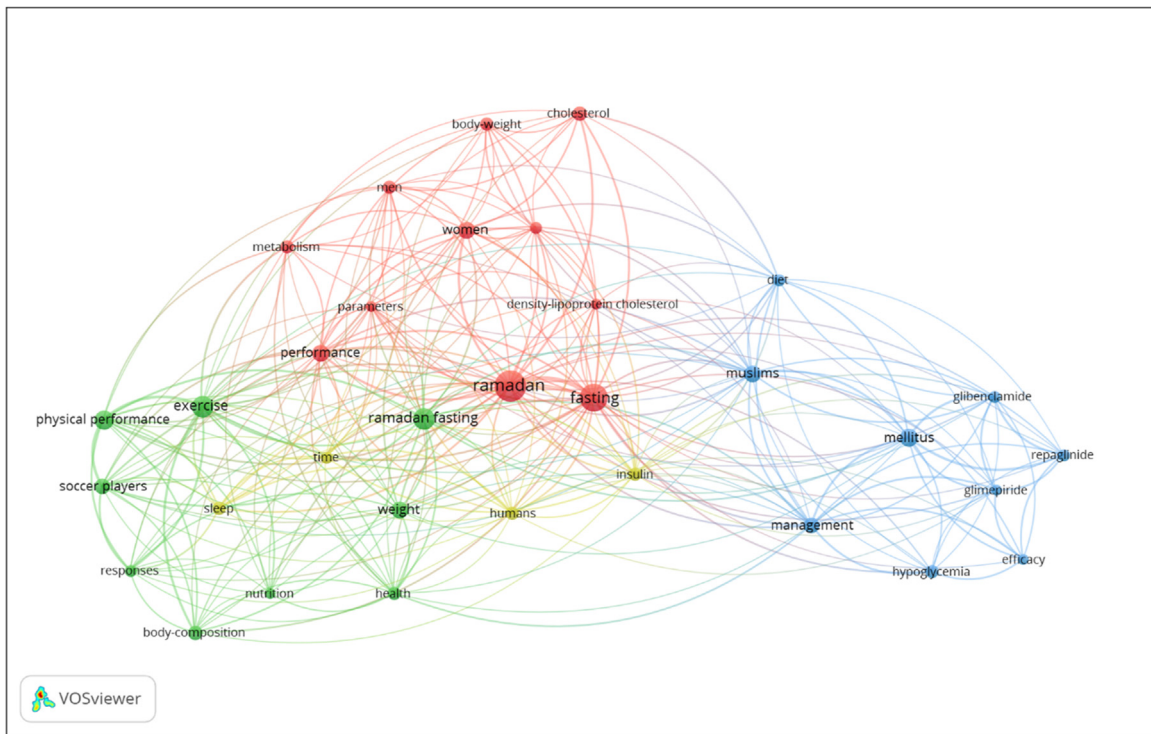


Fig. 5. The author keyword network the minimum occurrence of each keyword is six.

effects on patient general well-being and management of diabetes. The most common complications reported among these patients were diabetic neuropathy, retinopathy and nephropathy. In diabetic patients, the self-monitoring of glycemic control was low. In type 1 diabetic patients, the majority (92.3%) were treated with insulin alone and in type 2 diabetes (78.4%) received oral anti-diabetic drugs alone. The type 2 diabetic patients (78.7%) observe Ramadan fasting for 15 or more days as compared to the type 1 diabetic (42.8%) patients. The investigators have also reported the change in life style, weight and medications among the studied population. The second most cited paper received significantly less number of citations (129 citations) compared to the first top cited article (256 citations). The effects of maternal fasting and

fetal health were investigated. The natality files and census data showed that the maternal fasting is associated with low birth weights [26]. The third most cited study (100 citations) is a review that presents recommendations for management of diabetes during the month of Ramadan [27]. The paper outlines the key risks associated with fasting in patients with poor glycemic control (hypoglycemia, hyperglycemia, diabetic ketoacidosis, dehydration and thrombosis). It is important that patients who decide to fast during Ramadan should monitor their blood glucose level several times a day. Additionally, it was recommended that ingestion of food with large amount of carbohydrates and fats should be avoided specially at the sunset meals. These findings evidently stresses upon the need for enforcing a robust medical assessment

Table 2
Distribution of the top cited papers according to year of publication.

Publication year	Frequency
2008	17
2010	12
2011	11
2012	11
2004	9
2009	9
2005	8
2006	8
2007	6
2013	5
2014	3
2015	2
2017	1
Total	102

and patient education regimen before fasting can be advised in such patients.

There has been a considerable increase in research on Ramadan and health since 2004. Therefore, the present study included all the articles published from 2004 to 2019 (Table 2). The most likely reason for the increase in literature on Ramadan and health is an increased availability of funding from various sources particularly a surge in the interest levels of the pharmaceutical industry (as mentioned in the previously published bibliometric analysis on Ramadan fasting and diabetes) [13]. Similar findings were also reported in another bibliometric analysis pertaining to malaria in pregnancy [28]. In order to rank the top cited articles, we used citations count that is a common practice for conducting bibliometric analyses. When analyzing the impact of the research based on citations count, the factors that should be considered are the discipline or specialty, article type, self-citations, positive or negative citations, time since the paper published [29]. The majority of the top cited articles were original studies that were published by numerous medical journals having varying influence based on impact factor (Journal citation report 2018). These journals have interdisciplinary broader scope and may be useful for the researchers interested in publishing their work related to Ramadan and health in future (Table 1).

Among the prominent authors contributing to top cited research on Ramadan fasting and health (Table 1), the most productive first author is Anis Chaouachi. The author contributed mostly to the original manuscripts pertaining to the effects of Ramadan fasting on athletes. The same author is also among the prominent coauthors network (Fig. 2) who contributed extensively as a coauthor in the top cited manuscripts. This particular author is associated with National Center of Medicine and Science in Sports, Tunisia the top most contributing institution (Fig. 4). Previously conducted bibliometric study on sports and exercise medicine research in the Arab world also indicated leading contribution of Tunisian researchers in the specialty of sports and exercise medicine [30]. The authors based in the UK are the most prominent contributors together with authors from Turkey, Tunisia and Saudi Arabia. These countries have contributed to half of the top cited papers (Fig. 3). These findings are similar to the bibliometric study exploring the top cited research on Ramadan fasting and diabetes [13]. Saudi Arabia is also among the top countries contributing to Ramadan and health research. This finding may be due to the allocation of more resources for biomedical research, establishment of new Institutions, journals indexed in reputable databases and presence of international researchers [30]. The most frequently co-occurring author keywords are Ramadan, fasting, exercise, Ramadan fasting and physical performance. The keyword analysis reveals major domains of interest related to Ramadan and health research (Fig. 5).

There are certain limitations and constraints that are associated with the present bibliometric analysis. For instance, the older articles have more time to attain citations compared to the recently published articles. In order to overcome this limitation, we presented the average citations received per annum by an article while ranking the article based on citations count. The studies pertaining to Ramadan and health published in journals indexed in databases other than Web of Science (or that did not feature in any database) were not included in this analysis. Furthermore, our analysis is limited to articles published in English language only. The self-citations by the authors are included into the analysis, as there is no mechanism of exclusion of self-citation by the authors using Web of Science database. However, authors self-citations are sometime appropriate because those may be linked to continuation of an author's or research group's previous work [29]. This bibliometric analysis strives to provide a comprehensive insight into the relevant and impactful contributions made in the research area of Ramadan and health. It is hoped that both the clinicians and researchers are introduced to an important reading list of influential articles in this area.

Conclusion

This first bibliometric study of its kind that identified and analyzed the top cited research published globally on Ramadan and health. In addition to providing a list of the top cited articles in the area of Ramadan and health, this study also provides a quantitative overview of the prolific journals, authors, countries and institutions. In future, the authors urge closer and efficient collaborations between various countries, institutions and authors contributing to Ramadan and health research to foster research based quality growth of the body of knowledge in this area.

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Competing interests

None declared.

Ethical approval

Not required.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.jiph.2019.11.006>.

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