

# Oncology Research Productivity of Iraqi Authors: A Bibliometric Analysis During 1955–2019

Bushra H Shnawa<sup>1,2</sup>, Shireen M Al-Majmaie<sup>2,3</sup>

<sup>1</sup>*Department of Biology, Faculty of Science, Soran University, Erbil-Iraq,* <sup>2</sup>*Scientific Research Center, Soran University,* <sup>3</sup>*Department of Computer Science, Faculty of Science, Soran University*

## Abstract

Cancer is a major health enigma all over the world. In Iraq, cancer caused a large number of deaths and significant morbidity. Nevertheless, limited information is available on how cancer-related literature has developed. This study aimed to analyze the published research on cancer carried out by Iraqi authors by assessing a bibliometric analysis. Data from 1955 to 2019 was retrieved from Scopus and Google Scholar. The findings of the current study showed significant growth in recent research output regarding cancer, particularly after the 2000s, and more than half of Iraqi publications were internationally published as 79.4% of them. Breast cancer was the type of cancer most targeted by researchers in a percentage of (29%), and the degree of collaboration of Iraqi authors was high (0.808) according to the Subramanyamin method. This study is the first one to analyze Iraqi publications regarding cancer. Our results can help to direct a national knowledge program, planning, and funding assessments. Moreover, to establish new national and international organized collaborations.

**Keywords:** *Cancer, Lymphoma, Malignancy, Leukemia, Tumor, Iraq.*

## Introduction

Cancer is an important reason for morbidity and mortality worldwide regardless of the level of human development. The GLOBOCAN estimates indicated that there were 18.1 million new cases of cancer and 9.6 million deaths from cancer in 2018<sup>1,2</sup>. The percentage of cancer increased by 33% during the period between 2005 to 2015 as a result of population growth and aging<sup>3</sup>. Presently, cancer is the second cause of death internationally and is predicted to hit 27.1 million individuals by 2030 particularly in high-income countries. In Iraq, also cancer is the second leading cause of cancer death following cerebrovascular diseases<sup>4,5</sup>. It is known as an important and growing public health burden in

Iraq. Currently, Khoshnaw et al.,<sup>4</sup> found an increase in annual cancer incidence rates in Iraq, owing to increase of cancer with age and high proportions of hematological malignancies. This increased proportion of leukemia in most Iraqi towns was related to the exposure to depleted uranium, which was used during the wars against Iraq from 1990 until 2010<sup>6-10</sup>. Moreover, Al-Shammari<sup>11</sup> pointed out that the sand particles of Iraq contain toxic substances, which dates back to the pollution resulted from military activities that disassemble the desert sands and change it into light dust. This dust spreads to cities by dust storms. Also, the occurrence of depleted uranium in the Iraqi food chain is proved by evaluating the uranium in animals' organs in various Iraqi cities with the highest level in the south of Iraq. One of the main locations of pollution in Iraq is the Al-twaitha nuclear research site. Other researchers recorded that cancer incidences per 100,000 populations of Baghdad have increased; also, it is raised in Basra. Besides, total incidence of breast and lung cancer, Leukemia and Lymphoma, has doubled even tripled. The situation in Mosul governorate is like other regions and the percentage of cancer has further amplified since the Gulf War<sup>12</sup>. Previous review of

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### Corresponding Author:

**Dr. Bushra Hussain Shnawa**

Prof., Soran University, Faculty of Science, Biology  
Department, Kurdistan, Erbil- Iraq  
e-mail: bushra.shnawa@soran.edu.iq

Iraqi scientific publications regarding environmental pollutants concluded that Basrah, Baghdad, Falluja, Mosul and Thi-Qar are the most affected towns in Iraq<sup>11</sup>.

Productivity in the area of medical terms and research can be measured by some variables. The number of research publications is one of the parameters that can be used to evaluate productivity as well as the quality of research. This can be achieved by using bibliometric analysis<sup>13, 14</sup>.

Bibliometrics is a systematic method for assessing research productivity which can help map alterations in the interest of a scientific community over time<sup>15</sup>, and can provide visions into both qualitative and quantitative research trends. In bibliometric analysis, a large database, such as Scopus, is used to retrieve, analyze and present the data. In addition, bibliometric analysis shows citations and research collaboration. A citation is accounted for when research is referenced by another peer reviewed research. Citation analysis includes ranking and assessing an article or journal based on the sum of citations it collects. As well as to recognize the highest frequently cited research; bibliometric is also used to determine the impact of journals<sup>16</sup>.

### Method

Analysis of published researches regarding cancer in Iraq was conducted to analyze the trends of publications.

**The Database Used:** In this study data from Scopus (Elsevier) was used. Also, Google was searched to gather more articles that not present in Scopus. As well as Scopus and Google Scholar were dependent to collect the citation number of articles.

Bibliometric analysis was performed on March 2019 by downloading all the cancer papers related to Iraqi researchers published between 1955 and 2019, using the keywords including “Cancer”, “Malignancy”, “Lymphoma”, “Leukemia”, “Tumor” and “Iraq”.

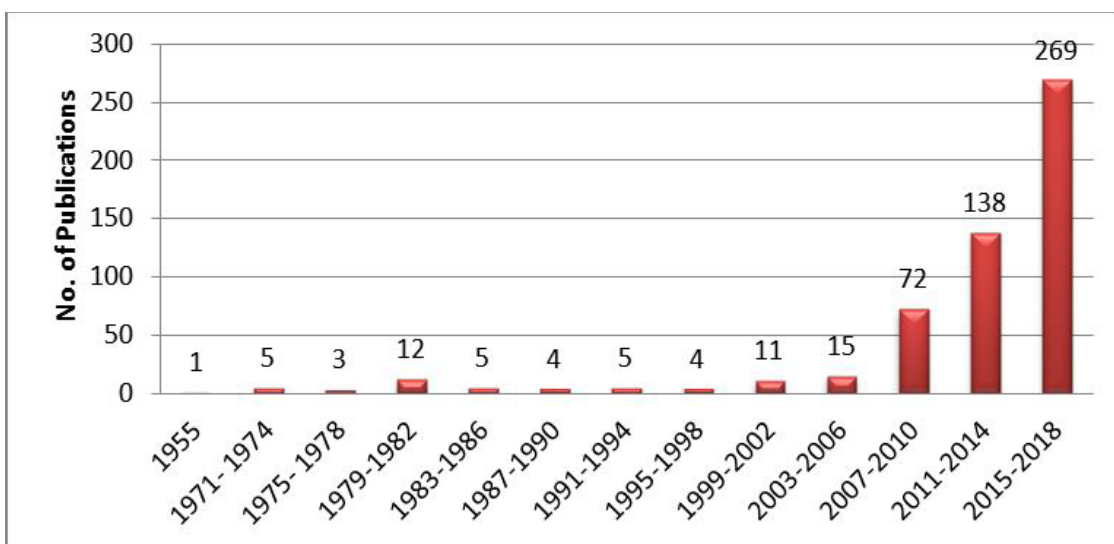
As in any bibliometric study, the retrieved data were arranged as MS Excel file, analyzed and tabulated for presenting the results. The following information was obtained for each article: title, journal name, date of publication, author, number of authors, type of journal, affiliation, and abstract. The data presented to show the annual growth of Iraqi cancer researches, most frequent keywords to explain research interest and publications gaps, national and international research collaboration, most active researchers, journals, governorates and institutions, and the most cited articles among the cancer researches that have the Iraqi affiliation. For calculating the degree of author’s collaboration, the mathematical method of Subramanyamin<sup>17</sup> was followed.  $C = \frac{Nm}{Nm + Ns}$ , Where, C = Degree of collaboration, Nm = number of multi-authored articles and Ns = number of single-authored articles.

**Statistical Analysis:** T-test was applied to determine the significant differences in the current results at level of 0.05% or less.

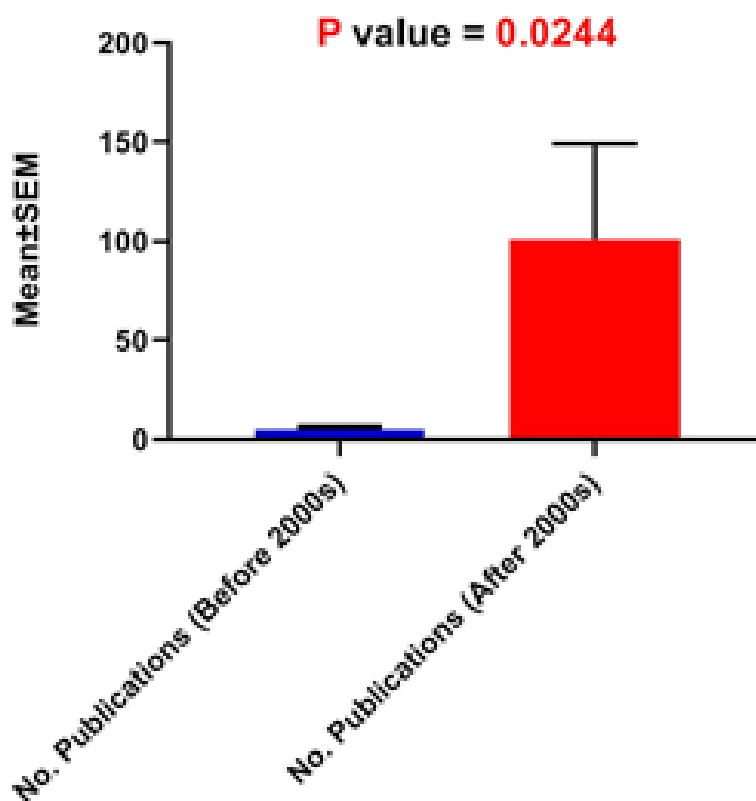
### Results

The initial search showed 736 references from both of the considered databases, and the final number of the researches was 544 after removing the duplicates.

The annual growth of Iraqi publications regarding cancer is represented in Figure 1, A. The graph shows that the number of publications remained low, followed by a steady phase until 2004. There was a noticeable sharp increase in the number of publications after 2005, which reached a maximum of approximately 269 publications in the last 4 years of the study period, and represented 49.4 % of the published articles concerning cancer by Iraqi authors. The statistical analysis of the present finding confirmed the occurrence of highly significant differences (P-value= 0.024) between Iraqi cancer publication before 2000 and that published after this year as in Figure 1, B.



A



B

**Figure 1. A. Distribution of publications by years, B. Comparison between number of publication before and after 2000s.**

Breast cancer was the type of cancer most targeted by Iraqi researchers 29.04 %, followed by the articles that cover: cancer as general, female reproduction system, intestinal, and cell line as 17.27%, 6.6%, 6.06%, 5.8% respectively, and then the articles that focused on

the other types of cancer as shown in Figure 2. There was a significant difference between the number of publications regarding breast cancer and that related to the other types of cancer ( $P < 0.05$ ).

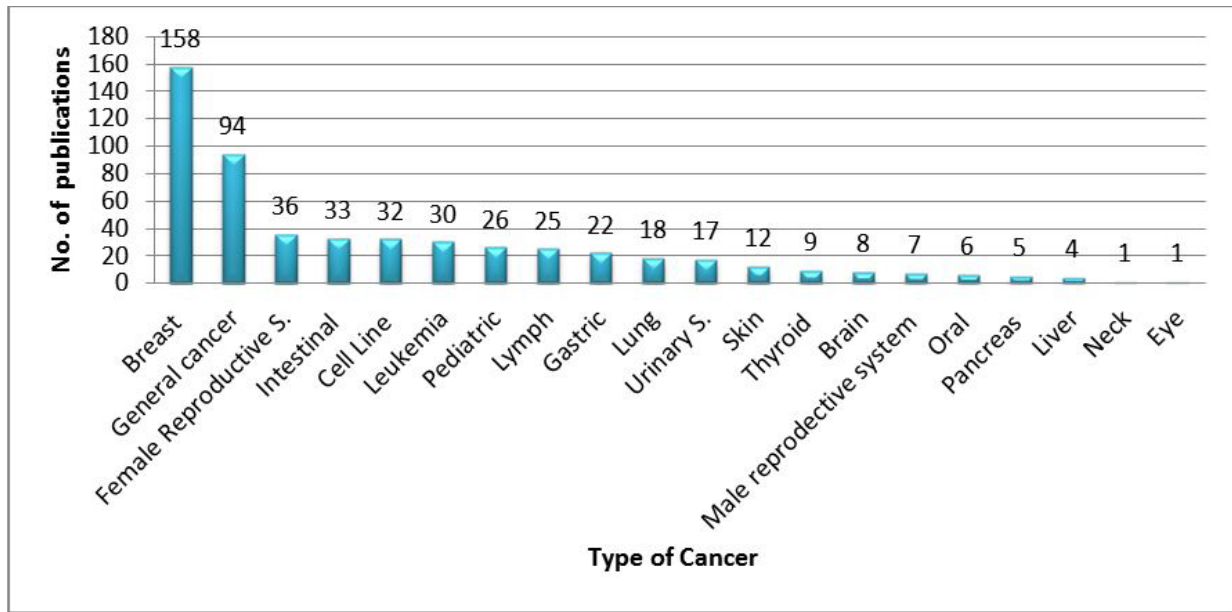


Figure 2. Number of publications by the type of cancer

Moreover, the current study revealed that the majority of articles were published by three authors as 29.59 %, followed by a single researcher as 19.1, and

double authors as 17.4% %, these results are summarized in Figure 3. The degree of collaboration of Iraqi authors was high as 0.808.

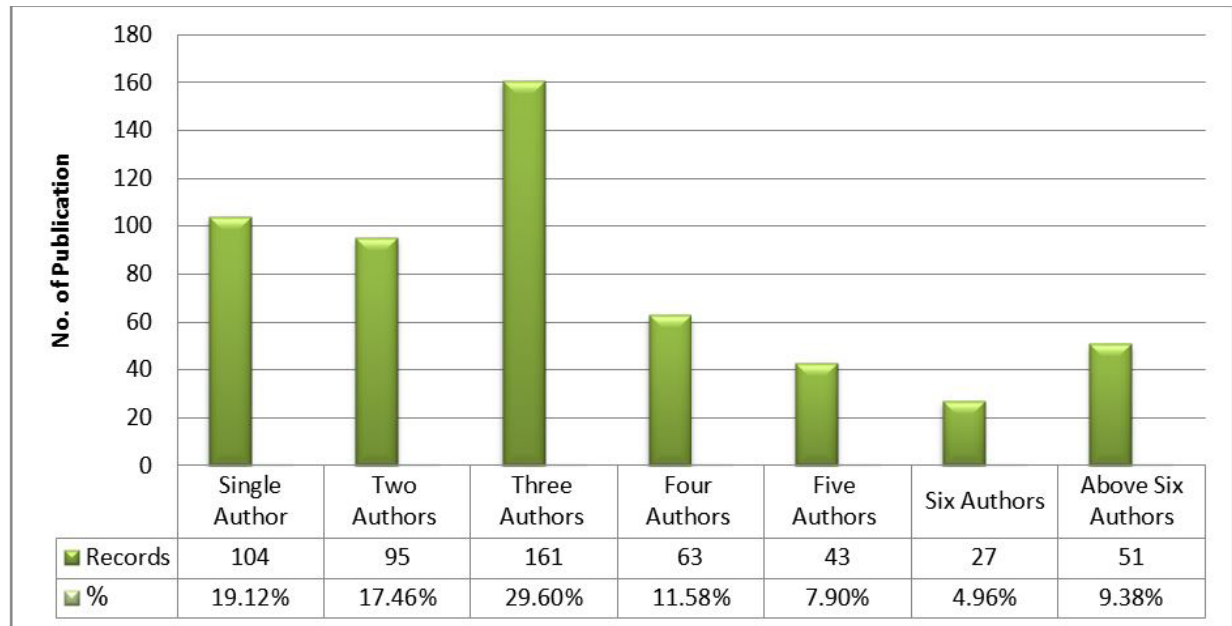
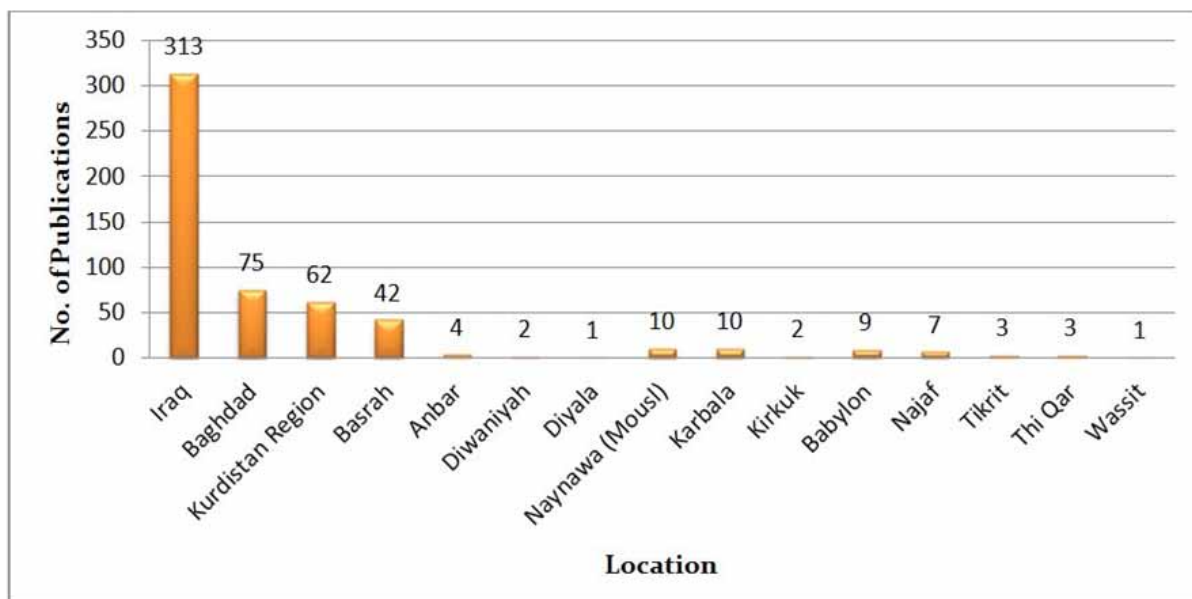


Figure 3. Number of publications related to authority

Regarding the relationship between the number of articles and location, the current finding showed that most publications included all Iraqi patients and didn't restrict to one area which reached 57.5 %, followed by

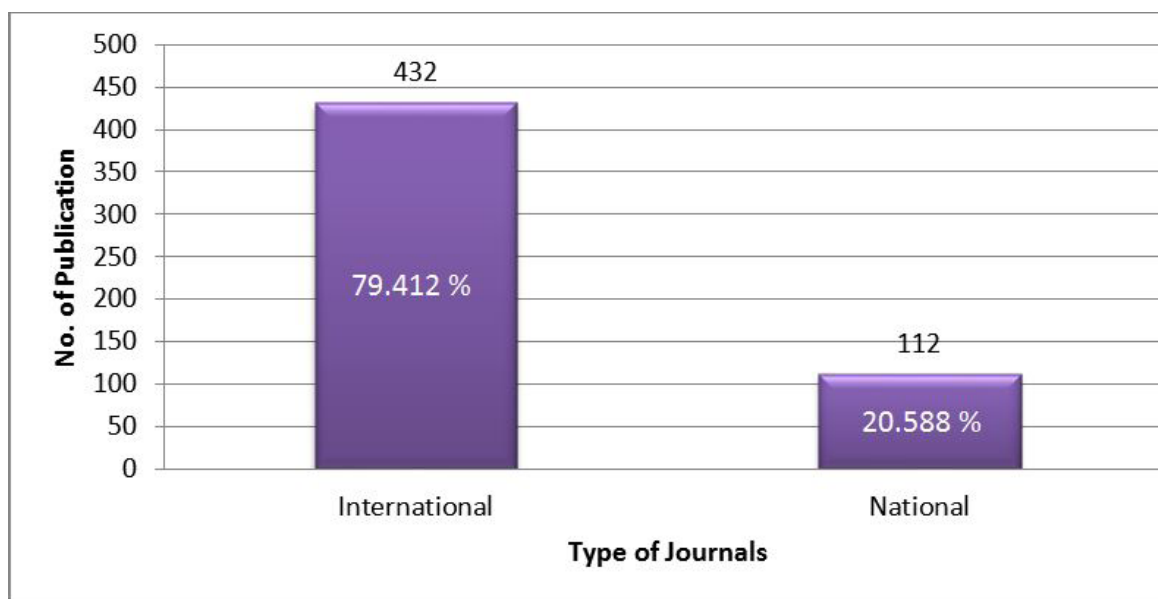
the articles that related to cancer patients of Baghdad (13.7%), Kurdistan (11.3%), and Basrah (7.7%) as shown in Figure 4.



**Figure 4. Iraqi cancer publications related to location**

Moreover, the majority of Iraqi articles regarding cancer was published in the international journal, in the percentage of 79.4 % compared to national journals as, 20.5% as shown in Figure 5. The number of internationally published publications significantly differing from that

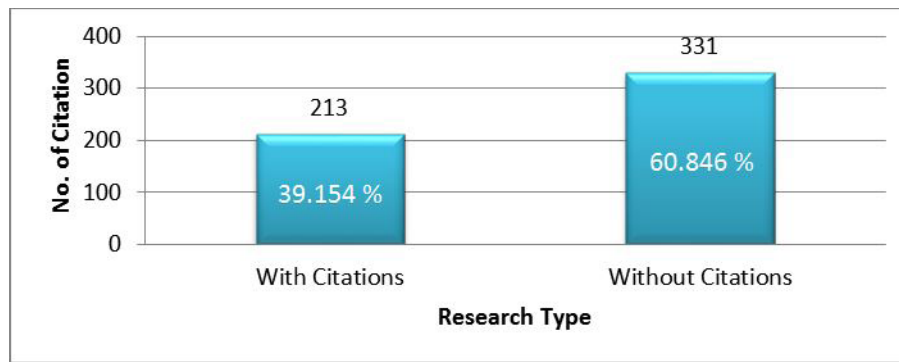
published in national journals ( $P < 0.05$ ). Also, the Asian pacific journal of cancer prevention and the journal of Faculty medicine - Baghdad University have recorded as the journals with most publications.



**Figure 5. Iraqi publications related to the type of journals**

Concerning citations, the current results showed that a total of 213 articles had citations and 331 papers without citations as shown in Figure 6. The top twelve research that ranked by the total number of citations has

recorded. The highest citation of the publications was 465 times, that captured by a study related to gastric cancer, published in Gastroenterology in 2007.



**Figure 6. Classification of Iraqi cancer articles depending on citations**

### Discussion

The current work is the first bibliometric research to analyze the Iraqi publications. Scopus (Elsevier) has been used owing to its inclusiveness of MEDLINE. Also, Scopus has a huge number of indexed journals (about 23,000 journals). So, the literature recovered from Scopus will be higher than that collected from the Web of Science and others. It is concluded that PubMed remains an important resource for medicine and biomedical sciences<sup>18</sup>. Moreover, Scopus has many characteristics that simplify citation analysis, calculating research partnership, and data arranged by Microsoft Excel for more tabulation and mapping. In fact, several published bibliometric researches have depended upon Scopus to collect their specific data<sup>19-21</sup>. Whereas; Cabral. et al.<sup>22</sup> performed their study using data from the Web of Science Core Collection. The finding of the current study showed that the number of Iraqi articles on cancer was significantly increased over the last years. Several factors may have contributed to this increasing trend. One important factor for this growth is that the global increase of cancer burden and particularly owing to the noticeable increase in the incidence of cancer in Iraq. Depending on the latest report of the Iraqi ministry of health in 2016, cancer resulted in 9.05% of all death, and it is the second leading cause of death in Iraq after cerebrovascular diseases<sup>23</sup>. Iraq, a war-torn country since the 1980s nowadays has several life challenges that have an impact on the population's development and its civil services. Medical health services and supplies considered as the most affected sectors in this country. In cancer care, for instance, there is deficiency in radiotherapy machines, inadequate funding, and infrastructure<sup>24-25</sup>. Intensity Modulated Radiation Therapy (IMRT) is one of the recent radiotherapy methods next to the 3-Dimensional-Conformal Radiation

Therapy which became available early 2000s in the developed nations. Despite all the challenges, IMRT was dependent in Iraq in 2013 and it is still running<sup>26</sup>. Furthermore, the degree of collaboration of Iraqi authors as high as 0.8, it is obvious from the present study that co-authorship and teamwork is a common phenomenon among cancer researchers in Iraq.

Regarding cancer types, the present data showed that there was a significant increase in the number of publications related to breast cancer. This finding confirmed the fact that the incidence of breast cancer in Iraq is relatively high, and has been increased during the previous few years, as concluded by a recent epidemiological investigation<sup>27</sup>. Since 2008, breast cancer incidence has amplified by more than 20%, although death has increased by 14% (522,000 deaths in 2012<sup>28</sup>). Similar to many other developing countries, Iraq struggles against the rising burden of breast cancer, the incidence in Iraqi females has risen in the last two decades and the frequency of the disease directed to younger age. *Owing to* lacking the healthcare, infrastructure required to identify, early diagnose, and the availability of treatment for the disease<sup>29-30</sup>. The cases in Iraqi female amplified from 26.6/100,000 in 2000 to 31.5/100,000 in 2009<sup>31</sup>. Moreover, it has been described that the average age at presentation of breast cancer in women from the Arabian region is about a decade earlier than the Western countries<sup>32</sup>. Results of recent investigation suggest that a comprehensive strategy to improve community awareness, surveillance, diagnosis, medication, and palliative care is required to decrease the emergent burden of breast cancer in Arab countries<sup>33</sup>. Furthermore, civil conflicts, added to the already existing social, political, and economic instabilities, certainly increase the burden of breast cancer in some Arab countries<sup>34</sup>. Also Abood<sup>35</sup> concluded that breast cancer onset at

least a decade earlier and at a late stage in Iraqi females when compared to patients of Western countries. Similar findings were documented in comparative research on the characteristics of breast cancer between Iraqi and British women. They pointed out that the mean age of the Iraqi patients at the time of diagnosis was 12 years younger than patients of Britain and also showed a higher tendency to infect advanced stages<sup>36</sup>.

Approximately 79% of Iraqi publications have been published in international journals, which represent a high percentage in comparison with articles published in national journals (20.5%). In this context, the current study has some limitations because some articles published in national journals were underestimated. Furthermore, numerous numbers of Iraqi publications have citations which reflected the importance of these studies, specifically which harvested a large number of citations like Rhead et al.,<sup>37</sup>. Recent findings suggested that in all subject areas, Google Scholar citation data is fundamentally a superset of Web of Science and Scopus, with considerable extra coverage<sup>38</sup>.

### Conclusion

This study showed that 49% of the number of publications was achieved during the period from 2015–2019. The occurrence of highly significant differences between Iraqi cancer publication before 2000 and that published after this year was also documented. The current study provides valuable insight into the cancer research productivity of Iraqi researchers. Also, it has clarified the trends among the investigation area. Besides this, the high degree of collaboration of Iraqi authors in this aspect, it was highlighted. This work proposes an evidence-based framework on which to initiate future research approaches and academic directions. Highlighting the causative agents of cancer, and how to develop effective control programs, are highly recommended.

**Conflict of Interest Statement:** We declare that we have no conflict of interest.

**Ethical Clearance:** It is not required

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