

# Review Article

## A Bibliographic Analysis of Studies Published by Iranians in PubMed Related to Shoulder and Elbow



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## ABSTRACT

**Background:** It is the goal of medicine discovery to help patients. It is therefore important to analyze studies published by Iranians in PubMed related to shoulder and elbow problems.

**Objectives:** We conducted a bibliometric search to determine the number of papers published by Iranian scholars in PubMed related to shoulder and elbow.

**Methods:** A search in PubMed database was conducted using 129 keywords such as shoulder, cubitus, bankart, rotator cuff, olecranon, etc. Articles with at least one author from Iran published from 1995 to 2021 were selected. The selected papers were studied in terms of the institution name, study subject, total number of papers, study design, contribution rate of Iranian orthopedic surgeons each year, annual number of papers published by Iranians in five journals with the greatest impact factor, and in journals with an impact factor.

**Results:** There were 463 eligible articles in the field of shoulder and elbow (17 per year); 89 (18%) were clinical trials, and 375 (82%) were retrospective studies. Fracture dislocations were the most common study subject (17%), 11 % related to shoulder and 6 % related to elbow. Among shoulder related articles, the most common study subjects were fracture dislocation (24%), brachial plexus (14%), rotator cuff (12%), and tumor (6%). In elbow related articles, the most common study subjects were fracture dislocations, tennis elbow, and cubital tunnel syndrome (23%, 21%, and 16%, respectively).

**Conclusion:** Although the number of articles published by Iranians in the field of shoulder and elbow in PubMed has increased significantly in recent years, there is still a long way for Iran to become a science exporting country.

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## 1. Introduction

The goal of discovering medicines is to help patients. Throughout the history, physicians have sought to find answers to their questions about diseases by conducting research [1]. There are increasing number of scientific journals and articles with improving quality worldwide [2]. The number of published papers is often used as an indicator of academic success and a measure for academic achievements, which makes research more attractive [3]. In recent years, there have been a growth in the number and quality of papers written by Iranian scholars due to a growing sense of need and interest among physicians in medical research [4]. Analyzing the published papers in each particular subject independently, and assessing their quality can reflect our knowledge of the study subject and reveal the studies' strengths and weaknesses [5]. Bibliometric analysis of studies on shoulder and elbow conducted in Iran can help policymakers in Iran determine how to plan and invest in more essential areas. Therefore, this study aims to examine the quality and quantity of studies related to shoulder and elbow in Iran from 1995 to 2021.

## 2. Methods

This is a retrospective study on studies related to shoulder and elbow in Iran from 1995 to 2021. The online search and abstract/title screening were performed using 129 keywords such as shoulder, cubitus, bankart, rotator cuff, olecranon, and etc. The search in PubMed database was conducted in Endnote software version 7. All papers with at least one Iranian author were selected. After deletion of duplicate records, two experts examined the titles and abstracts of the searched papers and eliminated those which were irrelevant to the shoulder and elbow. A total of 527 relevant articles from an offline database was yielded for additional analysis. Finally, papers were examined based on the name of the institution of the first author, area of research (shoulder surgery, elbow surgery, shoulder and elbow rehabilitation, and others), the overall number of published articles, study design (retrospective, prospective, clinical trial, case report), the participation rate of Iranian orthopedic physicians in each year and in the entire study period, annual publication of Iranian scholars' papers in five orthopedic journals with the highest Impact Factor (IF). names of publications that published the majority of Iranian scholars' articles, papers published in journals with IF<1, 1-3, or >3 every five years, and the average

number of articles published by Iranian scholars in journals with IF in every five years.

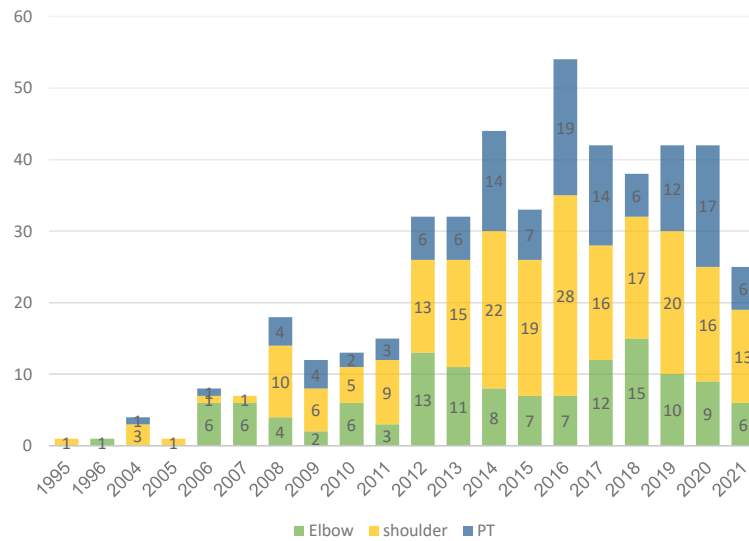
The data analysis was conducted in SPSS Software v. 19 (SPSS Inc., IMB Corporation, Chicago, Illinois, USA). The mean and standard deviation of continuous variables were calculated. Percentages were used to express categorical data. In case of normality in data distribution, one-way ANOVA was used to compare the papers based on the journal IF. A  $P < 0.05$  was statistically significant.

## 3. Results

The initial search yielded 2400 articles. after removal of duplicates, 1800 remained. After checking their titles and abstracts, 527 were found relevant. Then, we excluded 54 articles; 14 due to being published by vascular surgeons, 12 related to shoulder pain after laparoscopic surgery published mainly by gynecologists, and 28 related to nerve blocks for the shoulder and elbow published mainly by anesthesiologists. The remained 463 articles were recognized as relevant to our study, published by orthopedic surgeons, physiotherapists and emergency physicians. Figure 1 displays the increase in the number of articles published by Iranians in the field of shoulder and elbow surgery per year from 1995 to 2021.

The journals that published the majority of Iranian scholars' papers in the field of shoulder and elbow surgery were: Archive of Bone and Joint Surgery (8.5%), Journal of Shoulder and Elbow Surgery (5%), Journal of Bodywork and Movement Therapies (4%), Journal of Hand Surgery (2%), and Medical Journal of Islamic Republic of Iran (2%). In overall, 127 (27%) papers of Iranian scholars had been accepted in the five mentioned journals. Iranian journals accounted for 27% of all publications while non-Iranian journals accounted for 73% of them. We categorized the journals with IF into journals with IF<1, 1-3, and >3. We found a significant difference between the published Iranian scholars' papers each year in terms of journal IF ( $P=0.03$ ). Figure 2 shows the distribution of articles published by Iranian based on the journal IF.

Fracture dislocations were the most common study subject (17%), 11 % related to fracture dislocations in shoulder and 6 % related to fracture dislocations in elbow. Among articles related to shoulder, most frequent study subjects were fracture dislocations, brachial plexus, rotator cuff, and tumor with prevalence of 24%, 14%, 12 % and 6%, respectively. Most frequent study subjects in articles related to elbow were fracture dislocations,



**Figure 1.** Annual number of articles related to shoulder and elbow published by Iranians

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tennis elbow, and cubital tunnel syndrome (23%, 21% and 16 %, respectively). The prevalence of myofascial pain syndrome was 8 % in overall and 30 % in articles related to physiotherapy.

Figure 3 depicts the number of published articles based on the organizational affiliations of authors. The majority of studies on the shoulder and elbow had been conducted by authors from [Tehran University of Medical Sciences \(TUMS\)](#) (17%), [Shahid Beheshti University of Medical Sciences](#) (15%), [Iran University of Medical Sciences \(IUMS\)](#) (14%), [Mashhad University of Medical Sciences \(MUMS\)](#) (11%), [Isfahan University of Medical Sciences \(IUMS\)](#) (8%) and [Tabriz University of Medical Sciences \(TBZMED\)](#) (6%). Furthermore, 89 (18%) of papers were clinical trials, 91 (20%) were case reports, and 284 (61%) had other study designs.

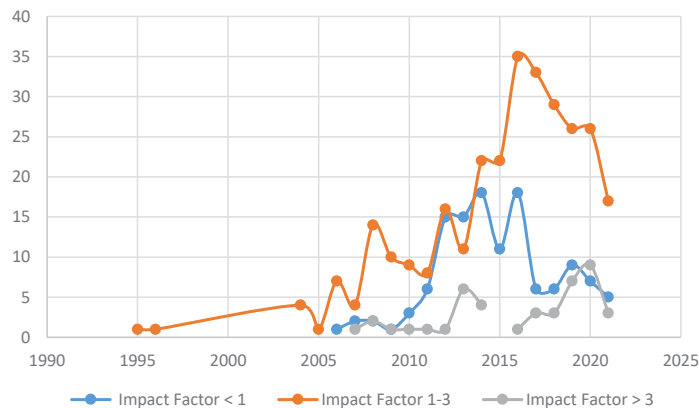
#### 4. Discussion

To our knowledge, no bibliographic research has been conducted on shoulder and elbow related papers. Most of them have assessed general orthopedic papers in a specific country. Iran ranks second in the Middle East region, after Turkey, in terms of the number of [published orthopedic articles](#). There was a global rise in the number of orthopedic articles in 2012, when the number of shoulder and elbow related papers doubled and has been increasing since then. Since 2005, there has also been an increase in the number of articles by Iranians in the field of shoulder and elbow. According to a study in Egypt, there were 485 orthopedic papers published during 2013-

2017. The most common published subject was trauma, and the most increase was related to arthroscopy [6-8].

It was shown that the number of papers published by Iranians and indexed in PubMed database has significantly increased, from less than four in 2005 to more than ten in 2008 and more than 30 in 2012. Iranian scholars have had a crucial contribution to science production in shoulder and elbow related subject since then. The total number of articles published by Iranians between 1995 and 2021 was 464 (17.1 papers per year). The mean number of published articles was 1.69 from 1995 to 2007 which surged to 14.5 from 2008 to 2011 and increased to 38 from 2012 and 2021. The reason for this increase can be the tendency of Iranian surgeons to publish and report their studies as well as their increasing rate of participation in international conferences [9]. Another explanation for this increase may be the engagement of Iranian orthopedic surgeons and researchers in foreign research institutes, which has paved the path for more investigations [10].

The greatest number of articles published by Iranians was related to fracture dislocations, possibly due to the high rate of motor vehicle accidents and increase in the elderly population [11]. Since the screening of patients encountered with such accidents is not obligatory for Iranian healthcare centers, little information can be found about non-trauma patients. This results in the focusing of the studies more on trauma patients that are more available prospectively. Orthopedic traumatology is also a well-established subject in orthopedics compared to other subjects, making it easier to be researched



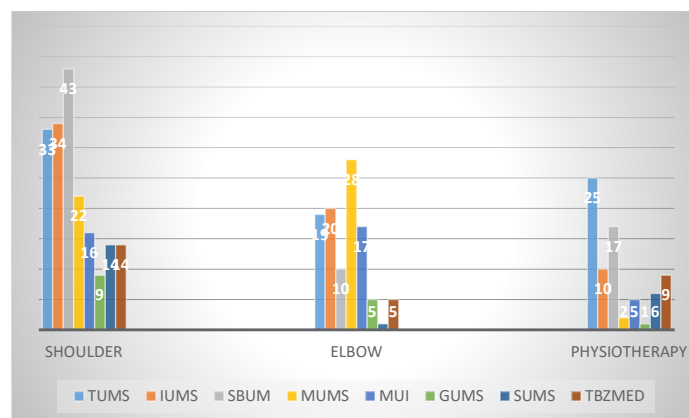
**Figure 2.** The number of articles published by Iranians per year based on the journal IF

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[12]. In shoulder related articles, the most common published branch was trauma (24%) followed by brachial plexus (14%) and rotator cuff (12%). The majority of brachial plexus related papers were from plastic surgeons focused on tendon transfer. The rotator cuff was the most research subject among orthopedic surgeons. This is consistent with advances in this disease knowledge, as well as developments in treatment alternatives such as arthroscopy, which has caught the attention of many surgeons and has become a global research trend [13]. Fracture dislocations were also the most common study subject in elbow related papers (23%), followed by tennis elbow (21%) and cubital tunnel syndrome (16%). Myofascial pain syndrome has mostly been studied by physiotherapists [14], since it is a non-surgical therapy and the majority of patients with this syndrome are referred to physiotherapists. There are several more subjects that need more research, such as shoulder impingement, instability, and frozen shoulder [8].

The majority of articles published by Iranians were case reports or case series, and other observational studies. Clinical trials accounted for 18.18% of all articles. Researchers are more interested in case series and observational studies, since most surgeons are more concerned with the outcomes of their procedures and the outcome of implementing new techniques. Observational studies, particularly case reports, take less time and need a simpler procedure. Another explanation for the lower number of clinical trials may be the time-consuming process of obtaining ethical approval codes, as well as the scholars' unfamiliarity with the research method, high costs, and more complicated study design.

The mean IF of journals published the articles of Iranians increased until 2016; after this year, despite reaching a constant number of articles per year, the number of publications in journals with IF>1 declined such that more articles were published in journals with IF<1. This



**Figure 3.** The number of shoulder and elbow related articles published by Iranians from different medical universities

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TUMS: Tehran University of Medical Sciences; IUMS: Iran University of Medical Sciences; SBUM: Shaheed Beheshti University of Medical Sciences; MUMS: Mashhad University of Medical Sciences; IUMS: Isfahan University of Medical Sciences; GUMS: Guilan University of Medical Sciences; SUMS: Shiraz University of Medical Sciences; TBZMED: Tabriz University of Medical Science.

can be due to the interest of Iranian scholars to publish more articles and the number of published articles seems more important to them than the quality of journal. The increase within five years may be attributed to an increase in the number of ISI indexed Iranian journals as well as a rise in their IF during these years. It is expected that the current increasing trend will be continued.

## 5. Conclusion

The papers published by Iranians in the field of shoulder and elbow have increased significantly in recent years, but there is still a long way that Iran can become a leading exporter of scientific information in the field of shoulder and elbow.

There were several limitations in our study. We only used the papers indexed in PubMed database, which is freely available and widely used. The papers indexed in other databases were not included in our study. Since only the first author's affiliation is listed in articles published in PubMed, we were unable to find the organizational affiliation of other authors. Finally, this study analyzed the studies in the field of shoulder and elbow including those conducted by orthopedic surgeons, anesthesiologists and physiotherapists; therefore, it was not possible to compare the studies in terms of research centers or universities in a particular domain.

## Ethical Considerations

### Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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### Authors' contributions

Conceptualization and design: Hooman Shariatzadeh, Farid Najd Mazhar, and Mohsen Motalebi; Data collection, Writing-original draft: Meysam Fathi Choghadeh; Data collection: Farhad Soltani.

### Conflict of interest

The authors declared no conflict of interest.

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