

A bibliometric analysis of publications on gunshot wounds, 1980–2022

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ABSTRACT

BACKGROUND: Deaths due to gunshot wounds (GSWs) have become an increasingly important public health problem in Türkiye and abroad. The aim of this study was to conduct a bibliometric analysis of articles about GSW.

METHODS: Within the scope of the research, the Web of Science database was examined with the bibliometrix program. GSW, gunshot injuries, gunshot injury, firearm wound, firearm injuries, and firearm injury were used as keywords.

RESULTS: As a result of the analysis, 1236 articles published in 479 different journals between 1980 and 2022 were reached. The annual growth rate of the articles was 6.69% and the average citation per article was 9.78. The United States of America (USA) (n=562, 45.4%), Türkiye (n=102, 8.25%), and India (n=42, 3.4%) were the top three countries with the highest publication performance. The top three most influential researchers are Elias Degiannis and Roger Saadia from South Africa and C. William Schwab from the USA. The most influential researcher of Turkish origin was Ersin Erdogan. “Journal of Trauma-Injury Infection and Critical Care,” “American Surgeon,” and “Injury-International Journal of the Care of the Injured” are the top three most influential journals in terms of the number of publications and citations. “Turkish Journal of Trauma and Emergency Surgery” from Türkiye is the eighth most influential journal. The most influential study in terms of citations was found to be the study titled “Firearm injuries in the United States” by Katherine A Fowler, published in *Prev Med* in 2015.

CONCLUSION: As a result of the research, useful information has been revealed for researchers working on GSW. Being the first comprehensive bibliometric study in the field of GSW makes this research unique.

Keywords: Bibliometric analysis; gunshot; wound.

INTRODUCTION

Deaths due to gunshot wounds (GSWs) are increasing in Türkiye and abroad.^[1] In the United States of America (USA), GSW is the most common cause of death after in-vehicle traffic accidents, especially in individuals aged between 10 and 20 years.^[2] In another study, it was stated that the number of deaths after GSW in the USA reached 100,000 cases annually, and more than half of these cases had extremity injuries.^[3] On the other hand, the rate of GSW is found to be lower in European countries.^[2,3] These epidemiologic studies include injuries caused by low-energy pistol bullets. However, due to Türkiye’s geopolitical position, extremity injuries with high-

energy firearms are more common during the fight against terrorism, and these types of injuries have higher rates of morbidity and mortality.^[4]

Bibliometrics is the analysis of scientific studies with the help of numerical analysis and statistics.^[5,6] Bibliometric studies enable researchers to have preliminary knowledge of the literature and can guide their research by showing the most effective studies.^[7,8] When the data obtained by bibliometric methods are collected and analyzed, information about the structure of the field, social networks, and current interests can be revealed.^[9,10] As a matter of fact, this study aims to provide researchers with detailed information about the sub-

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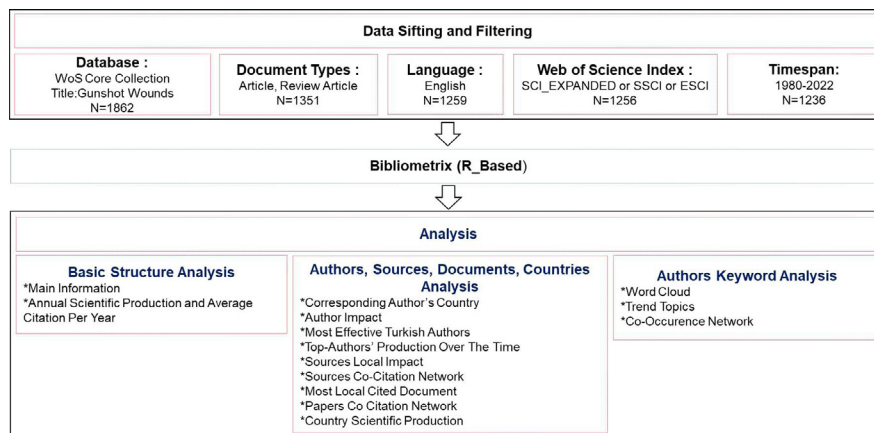


Figure 1. Workflow of science mapping

ject by examining the studies on GSW with the bibliometric analysis method.

MATERIALS AND METHODS

The workflow diagram that we have determined for the scientific word GSW, which is the subject of our study, is shown in Figure 1. The database used for our study is the Web of Science (WoS) database, which is one of the most complete and widely used databases for bibliometric analyses or literature searches.^[1]

The search was conducted in the WoS database on April 10, 2023. In the next stage, the data from the database was extracted and filtered. A search for publications with the title (“gunshot wound” OR “gunshot injuries” OR “gunshot injury” OR “firearm wound” OR “firearm injuries” OR “firearm injury”) in the WoS database identified 1862 articles. “Article and Review Article” were selected as the types of publication and a total number of 1351 articles were reached. When the publication language was selected as “English,” 1259 articles

were found and when the WoS index was selected as “SCI_EXPANDED or SSCI or ESCI,” 1256 articles were reached. Since new publications are still being included in the database, articles published in 2023 were excluded and a total of 1236 articles were included in the study.

The bibliometrix program was used to analyze the obtained data. The bibliometrix program is one of the latest open-source software developed based on R to perform science mapping.^[12]

In our review, 1236 articles were analyzed in three sections. The first section analyzed the basic structure of the articles in the field of GSW, the second section analyzed authors, journals, articles, and countries, and the third section analyzed author keywords.

Since the keyword “Gunshot Wounds” has very different spellings, it is necessary to combine the words in word analysis. In this context, “gunshot injury, gunshot injuries, firearm injury, firearm wound, firearm injuries, and wounds gunshot”

Table 1. Main information

Description	Results	Description	Results
Main information about data		Authors	
Timespan	1980:2022	Authors	4726
Sources (Journals, Books, etc.)	479	Authors of single-authored docs	72
Documents	1236	Authors Collaboration	
Annual growth rate %	6.69	Single-authored docs	76
Document average age	13.5	Co-authors per Doc	4.48
Average citations per doc	9.78	International co-authorships %	5.906
References	16576	Document types	
Document contents		article	1110
Keywords plus (ID)	1359	article; early access	11
Author's keywords (DE)	1785	article; proceedings paper	54
		review	61

were merged under the “gunshot wounds,” “firearm” was merged under the “firearms,” “injury” was merged under the “injuries,” “pediatric” was merged under the “pediatrics,” “ballistics” was merged under the “ballistics,” and “outcomes” were merged under the “outcome.”

In the study, h-index, g-index, and m-index values were taken into consideration in determining the most influential authors. An author’s h-index is the maximum number of publications (NP) that person has at least the same number of citations. The h-index measures how consistent the citations are, which is more important than the total number of citations. The g-index was determined for the performance of the author’s most read articles. The m-index enables comparisons between scientists with different academic careers. It is calculated by dividing the h-index by the number of years he has been academically active.^[8,10]

RESULTS

Basic Structure Analysis

Main information

A total of 1236 articles on our review topic GSW were published in 479 journals between 1980 and 2022. The annual growth rate of articles was 6.69%. The average citation per article was 9.78.

A total of 16576 references were used in the articles. 4726 authors were involved in the articles. The number of authors who had a single-author article was 72, the number of single-author articles was 76, and the number of co-authors per article was 4.48. 1785 author keywords were used. Other statistical information is presented in Table 1.

Annual scientific production and average citation per year

The annual amount of scientific publications and the average number of citations in the field of GSW research between 1980 and 2022 were obtained using bibliometrix as presented in Figure 2.

Although the NP made in the field of GSW research per year has shown fluctuations from 1980 to 2022, it is seen that it has generally displayed an increasing upward trend. While 6

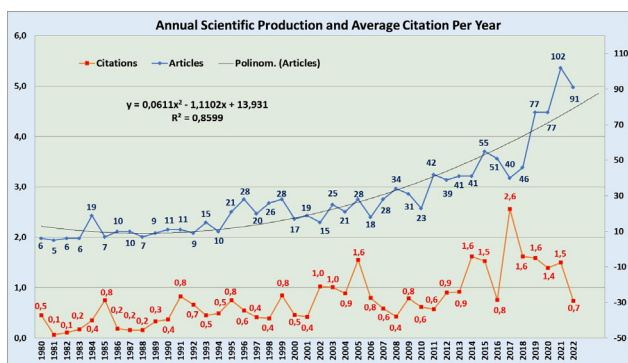


Figure 2. Annual scientific production and average citation per year

articles were published in 1980, this number reached 91 in 2022. The highest number of published articles was 102 in 2021 and the lowest number of published articles was 5 in 1981. The high number of articles produced between 2018 and 2021 is noteworthy compared to other years.

In our research, the R²-reliability coefficient, trend line, and equation were placed on the graph for the amount of scientific articles produced annually. The reliability coefficient was close to the integer 1 with a value of 0.8599 and the trend line represented the data at a very good level, although there were fluctuations in the amount of articles produced per year. The equation representing the trend line is shown on the graph. When the average number of citations per year was analyzed, the average number of citations per year was 2.6 for articles published in 2017, indicating that they received more attention than articles published in other years. The citation curve was clustered to the right of the table.

Authors, Sources, Documents, Countries Analysis

Corresponding author’s country

In order to further explore the details of the study area of GSW, the top 20 countries of responsible authors are shown in Figure 3. The figure was obtained from the bibliometrix in publication order. Figure 3 shows that the USA (n=562), Türkiye (n=102), India (n=42), South Africa (n=41), and the UK (n=32) are among the top five leading countries in terms of the total number of articles in the study area of GSW.

Among single-country authors, the USA (n=542), Türkiye (n=100), India (n=40), South Africa (n=36), and Pakistan (n=31) stand out, whereas among multicountry authors, the USA (n=20), the UK (n=9), Canada (n=6), and South Africa (n=5) stand out.

The multicountry publications (MCPs) ratio is obtained from the ratio of the number of MCPs to the total number of country publications. Egypt has the best MCP ratio value with a value of 0.43. After Egypt, the country with the highest MCP ratio value is England with a value of 0.28.

Türkiye was ranked 2nd in the list with 100 single-country publications, 2 MCPs, and 102 publications in total.

Author impact

The statistics of the top 20 most influential authors in the study field of GSW between 1980 and 2022 are shown in Figure 4. This figure was obtained according to the h-index value. Total NP, total citations (TC), h-index, and g-index were analyzed.

The h-index, brought to the literature by Jorge Hirsch, is based on a scientist’s most cited articles and the number of citations he receives in other publications.^[13,14] The authors with the highest h-index values in our study were Degiannis E (9), Saadia R (8), Schwab CW (8), Levy RD (7), and Nance ML (7).

The relationship between the NP made by the authors and

Table 2. Most effective Turkish authors

Author	h_index	g_index	m_index	TC	NP	PY_start
ERDOGAN E	3	3	0.12	45	3	1998
AKCAL MA	2	2	0.22	17	2	2015
ATALAY B	2	2	0.13	14	2	2009
BATCIK OE	2	2	-	13	2	-
CELIK H	2	2	0.22	12	2	2015
CELIKER M	2	2	-	13	2	-
CINAR K	2	3	0.20	16	3	2014
GONUL E	2	2	0.08	39	2	1998
GULLUPINAR B	2	2	0.20	5	2	2014
IFLAZOGLU N	2	2	0.22	17	2	2015
KANAT A	2	2	-	13	2	-
ONER OZ	2	2	0.22	17	2	2015
OZDEMIR B	2	2	-	13	2	-
SECER M	2	3	0.20	16	3	2014
ULUTAS M	2	3	0.20	16	3	2014
UREYEN O	2	2	0.22	17	2	2015
YALCIN S	2	2	0.13	14	2	2009
AGAR EH	1	1	0.50	1	1	2022
AKAY AF	1	1	0.06	5	1	2006
AKAY H	1	1	0.06	5	1	2006

Note: NP = Number of publications; TC = Total citations; PY_start = Publication year starting.

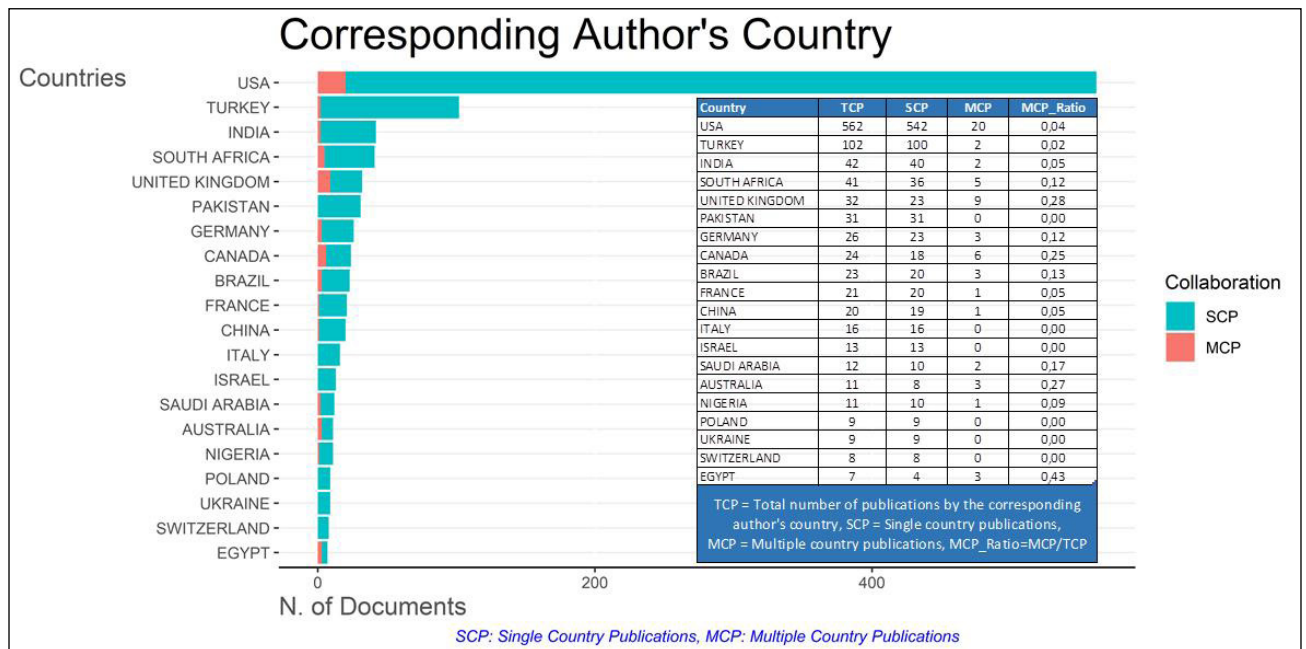


Figure 3. Corresponding author's country

the number of citations they received is shown in Figure 4. Authors named Gundersen Y, Opstad PK, and Vaagenes P received a total of 38 citations for 5 publications. These authors

have the highest publication citation rate. The authors named Allareddy V with a total of 44 citations for 4 publications, Goyal MK with a total of 91 citations for 8 publications, and

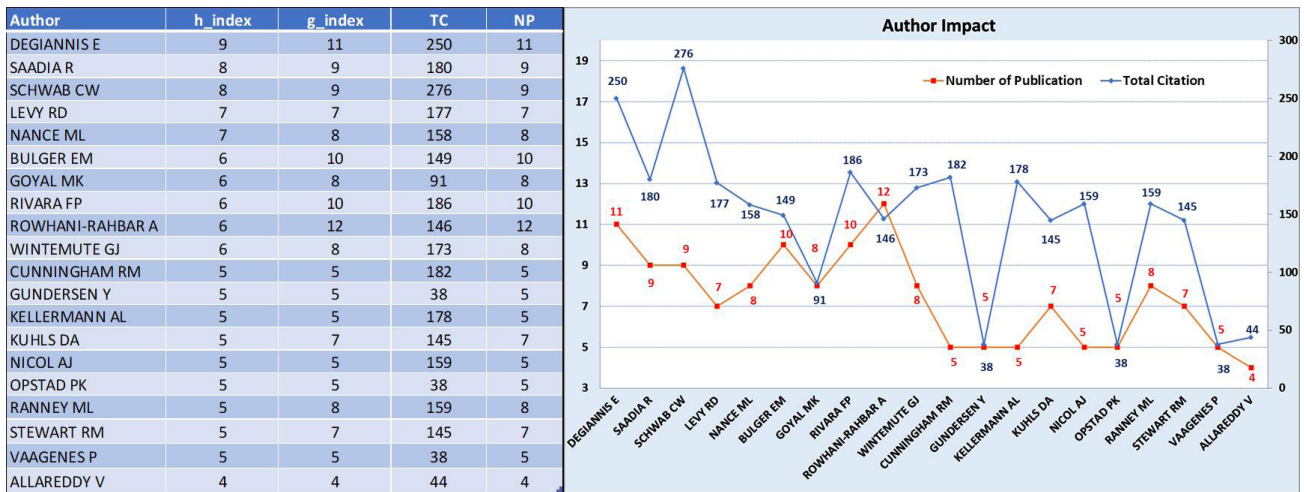


Figure 4. Author impact.

Rowhani-Rahbar A with a total of 146 citations for 12 publications have shown that they are effective in this field.

According to the g-index concept introduced to the literature by Leo Egghe in 2006; it is a disadvantage that citation scores are not taken into account in the h-index of articles in scientific disciplines. The g-index gives more importance to highly cited articles.^[15] The authors with the highest g-index values are Rowhani-Rahbar A (12), Degiannis E (11), Bulger EM (10), and Rivara FP (10).

The authors with the highest total number of citations are Schwab CW (276), Degiannis E (250), Rivara FP (186), Cunningham RM (182), and Saadia R (180). According to the h-index ranking, the authors with the highest NP are Rowhani-Rahbar A (12), Degiannis E (11), Bulger EM (10), and Rivara FP (10).

Most effective Turkish authors

Table 2 presents the corresponding author analysis of the

articles published on the subject of GSW where the corresponding author is Turkish. The table was made according to the h-index ranking. The author with the highest h-index value is Erdoğan E with h-index value of 3. The author with the highest g-index value is Erdoğan E with g-index value of 3. The author with the highest m-index value is Agar EH with 0.50 m-index value. The author with the highest number of citations is Erdoğan E with 45 citations and the author with the highest NP is Erdoğan E with 3 publications. Akcal MA (h=2, g=2, m=0.22, TC=17, NP=2) and Celik H (h=2, g=2, m=0.22, TC=12, NP=2), who started publishing in recent years (2015), also achieved very good statistics.

Top authors' production over the time

Figure 5 shows the publications of the authors who prepared articles in the study field of GSW during that period. When the length of the publication line is analyzed, the authors who have been publishing on the subject of GSW for the longest

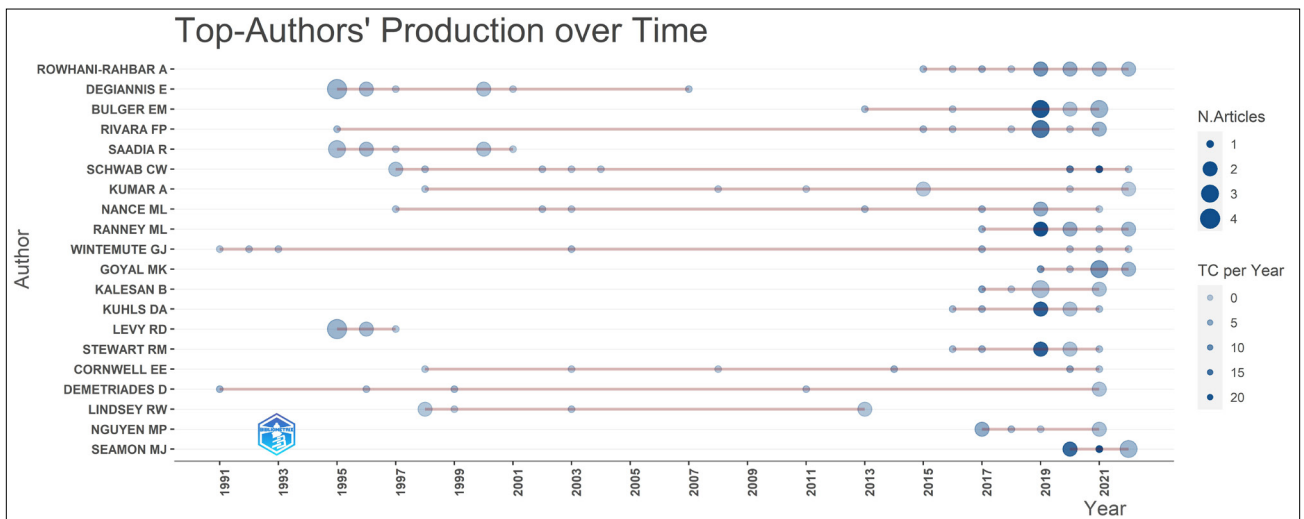


Figure 5. Top authors' production over the time

Table 3. Sources local impact

Source	NP	TC	TC/NP	h_index	PY_start
Journal of Trauma-Injury Infection and Critical Care	69	1032	14.96	18	1980
American Surgeon	26	46	1.77	4	1951
Injury-International Journal of the Care of the Injured	24	200	8.33	9	1982
American Journal of Forensic Medicine and Pathology	23	171	7.43	8	1981
Journal of Craniofacial Surgery	23	111	4.83	7	1995
Journal of Trauma and Acute Care Surgery	22	355	16.14	11	2013
Journal of Forensic Sciences	20	140	7.00	8	1982
Ulusal Travma ve Acil Cerrahi Dergisi-Turkish Journal of Trauma and Emergency Surgery	19	63	3.32	4	2007
Pediatrics	18	679	37.72	13	1986
Journal of Pediatric Surgery	16	193	12.06	7	1990
International Journal of Surgery Case Reports	13	61	4.69	4	2013
Forensic Science International	12	181	15.08	7	1984
Journal of Forensic and Legal Medicine	12	40	3.33	4	2009
Clinical Orthopedics And Related Research	11	309	28.09	8	1984
Journal of Oral and Maxillofacial Surgery	11	106	9.64	6	1982
Military Medicine	11	50	4.55	5	1986
World Neurosurgery	11	30	2.73	3	2011
Cureus	11	6	0.55	1	2018
Pakistan Journal of Medical and Health Sciences	11	1	0.09	1	2012
American Journal of Preventive Medicine	10	73	7.30	6	1993

NP: Number of publications; TC: Total citations; TC/NP: Citations per paper; PY_start: Publication year starting.

time are Wintemute GJ (1991–2022), and Demetriades D (1991–2021). Wintemute GJ has been publishing for 31 years and still continues to publish. When we look at the production of the authors over time, it is seen that 8 of the first 20 authors started to publish in 2015 and later.

The size of the circles in the figures indicates the NP that was produced during that year. The darker color of the circles indicates the total number of citations received by the author per year. Degiannis E and Levy RD produced the highest number of articles in a year with 4 articles in 1995. Seamon MJ was the most cited author during that period with 21.33 citations in 2021.

In 2022, the closest time to the present, Seamon MJ had the highest number of articles and the highest annual citation value with 3 articles and 3 annual citations.

Sources local impact

Table 3 shows the top 20 journals (source local impact) ranked by total NP. These top 20 journals publish 30.18% (373/1236) of the total articles.

“Journal of Trauma-Injury Infection and Critical Care” published 5.58% (69/1236) of all articles and “American Surgeon” published 2.10% (26/1236) of all articles. The journal with the

highest number of citations for GSW is “Journal of Trauma-Injury Infection and Critical Care” with 1032 citations. The second most cited journal is “Pediatrics” with 679 citations.

We also analyzed the number of citations per article, which shows the ratio between the number of citations and the number of documents for each journal. With a value of 37.72, “Pediatrics” presents the highest average citation value per article.

“Journal of Trauma-Injury Infection and Critical Care” has the highest h-index with a value of 18. The amount of publications of the “Journal of Trauma-Injury Infection and Critical Care” is also quite good with a value of 69. Although the NP of the “American Journal of Preventive Medicine,” which ranks last in the table, is low, its h-index value of 6 is quite good.

When evaluated according to the year of publication, the “Journal of Trauma and Acute Care Surgery,” which started its publication life in 2013, has become influential in the field in a short time with 22 publications, 355 citations, and 11 h-index values.

Sources co-citation network

The sources co-citation network was examined by analyzing

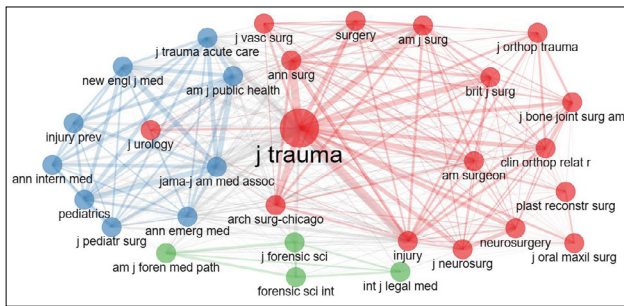


Figure 6. Sources co-citation network.

the citations of articles in journals that published articles with the title of GSW. As presented in Figure 6, the co-citation network of the top 30 journals is divided into 3 sets of nodes represented by red, blue, and green circles. Each circle represents a journal.

The red cluster is the largest one and consists of 17 journals. Looking at the size of the circles, J Trauma Journal in the red cluster has the highest number of co-cited articles among all journals. The blue cluster consists of 9 journals, and the green cluster consists of 4 journals and there is no journal with a dominant position in the co-citation network.

When the thickness of the lines between them is examined; the articles published in J Trauma - Injury, J Trauma - Ann Surg, J Trauma - Am J Surg, J Trauma - Brit J Surg, J Trauma - Am Surgeon, and J Trauma Arch Surg - Chicago journals in the red cluster, and the articles published in Jama - J Am Med Assoc - New Engl J Med, Jama - J Am Med Assoc - Am J Public Health, and Jama - J Am Med Assoc - Pediatrics journals in the blue cluster are the articles that are most co-cited by other articles.

Most locally cited document

Citation analysis was conducted to identify the most cited articles published in the study area of GSW and the links between these articles. Citation analysis is commonly used to investigate the underlying intellectual structure and developmental dynamics of a field of study. The 20 most cited publications in GSW are presented in Table 4 in descending order of the number of local citations (LC).

LC is the number of times an article is cited by 1236 articles in the WoS dataset, whereas global citation is the number of times a publication is cited in the WoS database. The articles of Fowler KA 2015, Grossman DC 2005, Fowler KA 2017, Spitzer SA 2017, and Cook PJ 1999 received 52, 38, 37, 26, and 25 LC, respectively. The articles of Grossman DC 2005,

Table 4. Most local cited document

Document	YP	LC	LC/YYP	GC	GC/YYP	LC/GC Ratio %
Fowler KA, 2015, Prev Med	2015	52	6.500	270	33.750	19.26
Grossman DC, 2005, JAMA-J Am Med Assoc	2005	38	2.111	357	19.833	10.64
Fowler KA, 2017, Pediatrics	2017	37	6.167	180	30.000	20.56
Spitzer SA, 2017, Am J Public Health	2017	26	4.333	67	11.167	38.81
Cook PJ, 1999, JAMA-J Am Med Assoc	1999	25	1.042	108	4.500	23.15
Leventhal JM, 2014, Pediatrics	2014	24	2.667	83	9.222	28.92
Senger C, 2011, J Pediatr Surg	2011	22	1.833	39	3.250	56.41
Srinivasan S, 2014, Arch Dis Child	2014	20	2.222	47	5.222	42.55
Lee J, 2013, J Trauma Acute Care	2013	19	1.900	62	6.200	30.65
Kalesan B, 2017, Am J Epidemiol	2017	19	3.167	43	7.167	44.19
Bartlett CS, 2003, Clin Orthop Relat R	2003	18	0.900	103	5.150	17.48
Livingston DH, 2014, J Trauma Acute Care	2014	18	2.000	57	6.333	31.58
Webster DW, 1992, Pediatrics	1992	17	0.548	60	1.935	28.33
Persad IJ, 2005, Injury	2005	17	0.944	47	2.611	36.17
Kaufman EJ, 2021, JAMA Intern Med	2021	15	7.500	64	32.000	23.44
Mirovsky Y, 2005, Spine	2005	14	0.778	31	1.722	45.16
Martin CA, 2012, J Pediatr Surg	2012	14	1.273	29	2.636	48.28
Grossman DC, 1999, Arch Pediat Adol Med	1999	13	0.542	119	4.958	10.92
Greenspan AI, 2002, J Trauma	2002	13	0.619	68	3.238	19.12
Hamilton EC, 2018, J Trauma Acute Care	2018	13	2.600	51	10.200	25.49

YP: Year of publication; LC: Local citations; YYP: Year 2023–year of publication; GC: Global citations; LC/YYP: Local citations/year 2023–year of publication; GC/YYP: Global citations/year 2023–year of publication; LC/GC: Local citations/global citations.

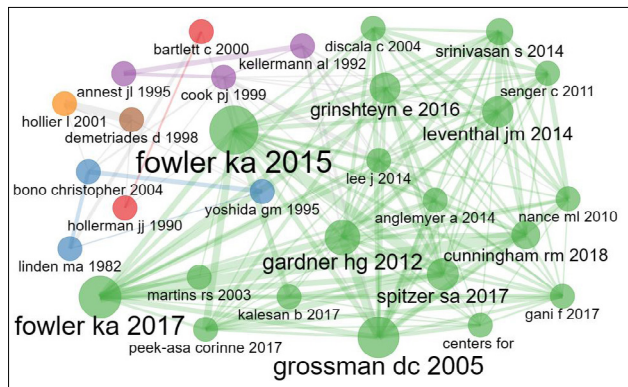


Figure 7. Papers co-citation network.

Fowler KA 2015, Fowler KA 2017, Grossman DC 1999, and Cook PJ 1999 received 357, 270, 180, 119, and 108 general citations, respectively.

The first publications in the period under review have more time to receive citations. However, publications at the end of the period do not have enough time to receive sufficient citations. To eliminate the negative effects of the short post-publication periods of publications published in the last years of the process and to show the effect of the years of publication of the articles, the definitions of annual LC (LC/YYP) and annual global citations (GC/YYP) were developed. The article with the highest LC/YYP value (7,500) is Kaufman EJ 2021 and the article with the highest GC/YYP value (33,750) is Fowler KA 2015.

Another concept generated for the most cited authors is the local citation percentage. The article with the highest local citation percentage is the article by Senger C in 2011 with a value of 56.41%. The local citation percentage is obtained from the ratio of the local citation amount to the overall number of citations.

The Kaufman EJ 2021 article, which was published most re-

cently, received 15 LC and 64 GC, making it the most influential article in recent times.

We can say that the most influential ones about the study topic of GSW are the articles of Fowler KA 2015, Grossman DC 2005, Fowler KA 2017, Spitzer SA 2017, Grossman DC 1999, Cook PJ 1999, Kaufman EJ 2021, and Senger C 2011.

Papers co-citation network

The paper co-citation network was examined by analyzing the co-citations of the publications in the literature about GSW. As presented in Figure 7, the co-citation network of the first 30 papers is divided into 6 clusters of nodes indicated by green, blue, purple, red, brown, and orange circles. Each circle represents an article and each color represents a cluster. The presence of a connecting line between the circles representing the article indicates that there is a relationship between them. The thickness of the line between the circles indicates the intensity of the relationship.

The cluster with the most co-cited articles is the green cluster. There are 19 articles in the green cluster. The most co-cited articles in the green cluster are Fowler KA 2015, Fowler KA 2017, Grossman DC 2005, Gardner HG 2012, Spitzer SA 2017, Leventhal JM 2014, Grinshteyn E 2016, Cunningham RM 2018, and Srinivasan S 2014.

There are 3 articles in the blue cluster, 3 in the purple cluster, 2 in the red cluster, 1 in the brown cluster, and 1 in the orange cluster. Although the articles in the brown and orange clusters are cited, they are not cited enough by other articles to form a co-citation cluster.

When the thickness of the lines between the articles is analyzed, the most co-cited articles are Fowler KA 2015 - Spitzer SA 2017, Fowler KA 2017 - Cunningham RM 2018, Hollier I 2001 - Demetriades D 1998, Gardner HG 2012 - Grossman DC 2005.

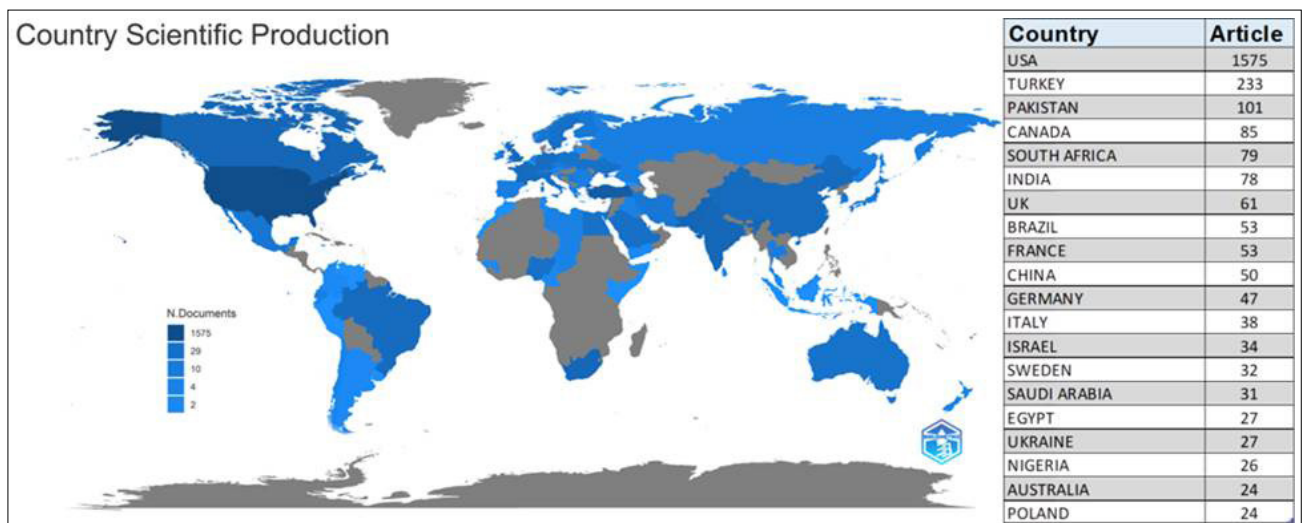


Figure 8. Country scientific production.

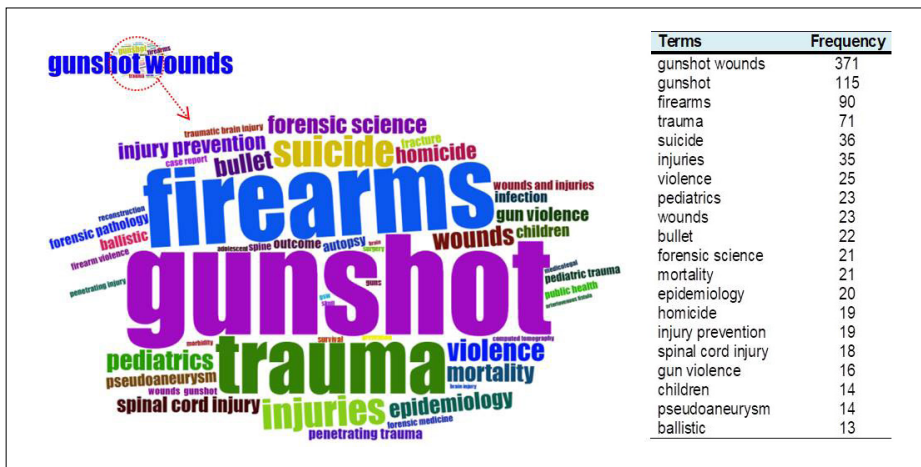


Figure 9. Word cloud.

Country scientific production

The distribution of 4726 authors, who made studies about GSW, according to countries, is shown in Figure 8. 1575 authors who published articles on GSW belong to the USA. After the USA, the authors who published the highest number of articles in the field of GSW are from Türkiye, Pakistan, Canada, and South Africa, respectively.

Authors Keyword Analysis

Word cloud

Keywords are determined by the authors to define the article. When it is considered that these keywords represent the article, it is accepted as noteworthy to analyze with these words and to identify the current issues and themes of the field of study.^[16]

The frequency of keywords (amount of repetition) for the study field of GSW was obtained using bibliometrix. The word cloud is a graphical representation of the most recent concepts in the study field of GSW.

It becomes easier to identify intertwined subjects through

word clouds and to analyze the trending words of these subjects over the years.^[17]

The larger the keywords appear, the more frequently they were used in the dataset. As shown in Figure 9, the top 20 most frequently emerged keywords identified by the article authors are presented in the table and the top 50 are presented in the word cloud. The keywords GSW, gunshot, firearms, trauma, and suicide were most frequently used.

Trend topics

The graph in Figure 10 shows the years in which the keywords identified by the authors became popular. The first 3 keywords used at least 5 times in each year are visualized.

While the keywords such as wounds gunshot, brain, skull, pregnancy and forensic science were used more frequently in the studies about GSW between 1997 and 2009, public health, gun violence, firearm violence, case report, and epidemiology have become more trending nowadays. Considering the size of the circles, GSWs and gunshot were the most frequently used keywords in 2015, and Firearms and Trauma in 2018. Figure 10 shows which words were trending in which years.

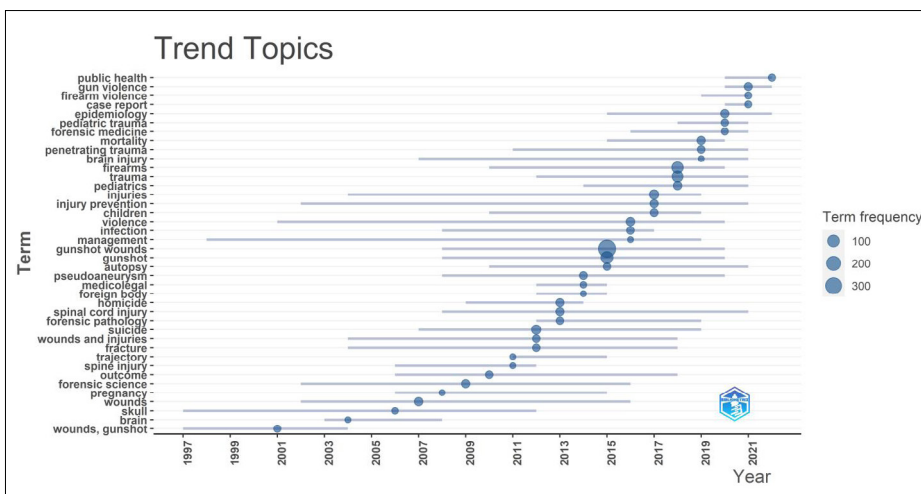


Figure 10. Trend topics.

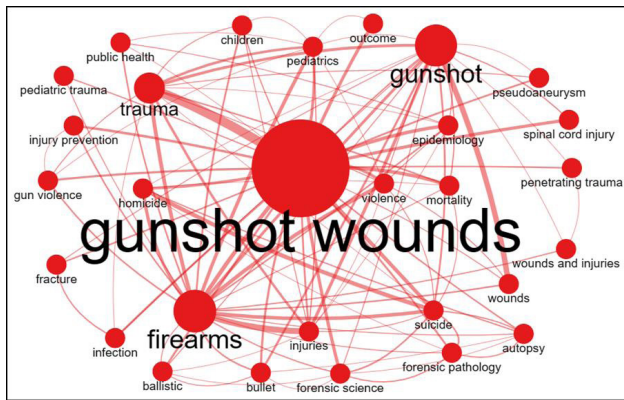


Figure 11. Co-occurrence network.

Co-occurrence network

Figure 11 presents the author-generated keywords co-occurrence network representing articles about GSW. The co-occurrence network for the first 30 keywords is analyzed.

The keywords were clustered in a single cluster in red color. GSW, gunshot, firearms, and trauma were the dominant keywords in the red cluster and represented the cluster. This becomes clear when we look at the size of the circles.

The thicker the lines between two keywords, the more those two keywords were used together in more publications. When the thickness of the lines between the keywords is examined, it is seen that the strongest bonds are between the following keywords: GSW - Trauma, Firearms - Injuries, Gunshot - Wounds, Homicide - Suicide, Firearms - Pediatric, GSW - Outcome, GSW - Mortality, GSW - Suicide, Firearms - Trauma, GSW - Firearms, Firearms - Violence.

DISCUSSION

The bibliometric studies have attracted attention, especially in the field of medicine, and since the first bibliometric article was published in the “Journal of the American Medical Association (JAMA)” in 1987, such studies on different topics have been regularly published in the literature.^[18] A review of the literature reveals that bibliometric studies about GSW are only available in the field of orthopedic trauma,^[19] however, it has been realized that a comprehensive bibliometric study has not been conducted and this study aims to fill this gap in the literature.

In the WoS database, it was found that the first article about GSW was published in 1980 and there were a total of 1236 published articles until 2023. The annual growth rate of articles is 6.69%. The average citation per article is 9.78. It is seen that the annual article production showed a significant increase after 2018 and reached a peak in 2021 (n=102). Due to the increasing burden of firearm injuries, it is thought that this subject remains up-to-date and attracts the attention of researchers.

When the publication performance of the countries according

to the countries of the corresponding authors is evaluated, it is seen that the USA (n=562, 45.4%), Türkiye (n=102, 8.25%), and India (n=42, 3.4%) are the leading countries. A total of 4726 researchers were involved in all the articles (n=1236) and when the performance of the countries according to the countries of these authors was analyzed, it was found that most of the researchers were from the USA (n=1575, 33.3%), Türkiye (n=233, 4.9%), and Pakistan (n=101, 2.1%). Considering all these data, it can be said that the USA ranks first and Türkiye ranks second in the field of GSW.

When researchers are evaluated in terms of the NP and citations about GSW, Emeritus Professor Elias Degiannis, who works in South Africa (Department of Surgery, University of the Witwatersrand), is the most influential author. Professor Roger Saadia from the same university and department is the second most influential author. Emeritus Professor C. William Schwab from the USA (Department of Traumatology, Surgical Critical Care, and Emergency Surgery, University of Pennsylvania Perelman School of Medicine) is the third most influential author. When the top 20 leading authors are evaluated, it is seen that the majority of them are surgeons and there are no Turkish authors.

When the NP and citations of Turkish authors who have conducted research on GSW are analyzed, it is found that Professor Ersin Erdogan, a neurosurgeon who has been working at Gülhane Military Medical Academy for many years and now in his clinic in Ankara, is in the first place. Associate Professor Mehmet Akif Akcal, an orthopedic and traumatology specialist at Anatolia Hospital in Antalya, is in second place. Professor Belir Atalay, an oral, dental, and maxillofacial surgeon at Istanbul University, ranks third.

“Journal of Trauma-Injury Infection and Critical Care” (now called The Journal of Trauma and Acute Care Surgery), the official publication of the American Association for the Surgery of Trauma, which began indexing in WoS in 1980, was found to be the most influential journal, publishing 5.5% of all articles about GSW. “American Surgeon,” the official publication of the Congress and the Southern California Chapter of the American College of Surgeons, which began to be indexed in 1951, ranks second, publishing 2.1% of all articles. “Injury-International Journal of the Care of the Injured,” which is the official publication of societies such as The British Trauma Society and Australasian Trauma Society and started to be indexed in 1982, ranks third by publishing 1.9% of all articles. “Turkish Journal of Trauma and Emergency Surgery,” which is the official publication of the Turkish Association of Trauma and Emergency Surgery and started to be indexed in 2007, is the eighth most influential journal, publishing 1.5% of all articles. The fact that these journals are reviewed in indexes accepted in the scientific world and supported by professional organizations may have an impact on their preference by researchers.

When the publications about GSW were evaluated in terms of citations (LC:52, GC:270), it was found that the most influential study was the study titled “Firearm injuries in the

United States” published in *Prev Med* in 2015 by Fowler et al., PhD, a clinical psychologist from the US Centers for Disease Control and Prevention, and colleagues. This study aimed to examine the epidemiology of GSW in the United States and concluded that GSW is an important public health problem for American society.^[20]

The second most influential study (LC: 38, GC: 357) was the study titled “Gun storage practices and risk of youth suicide and unintentional firearm injuries” by pediatrician Professor David C. Grossman (Department of Health Services, University of Washington, USA) and colleagues published in *JAMA* in 2005. In this study, concealment of guns and ammunition by adults was investigated to reduce GSW in young people and it was concluded that concealment/locking would be an effective prevention method.^[21]

The third most influential study (LC: 37, GC: 180) was published by Fowler et al. in *Pediatrics* in 2017 with the title “Childhood firearm injuries in the United States.” In this study, the effects of GSW among children aged 0-17 years in the USA were examined and it was concluded that GSW is an important factor in the mortality and morbidity of children.^[22]

When the word cloud and trending topics were analyzed, it was found that GSW, gunshot, firearms, and trauma were the most used keywords in the subject of GSW. While the keywords such as wounds, gunshot, brain, skull, pregnancy, and forensic science were used more frequently between 1997 and 2009, the keywords such as public health, gun violence, firearm violence, case report, and epidemiology have become more trending. In the light of the results of previous studies and the events that took place, it is seen that the research topics have also been changing over time.

CONCLUSION

Within the scope of the study, 1236 articles were examined and it was seen that the number of articles on GSW increased from year to year. Therefore, it is thought that the subject of GSW has attracted the attention of researchers. It has been found that Türkiye is the second country that produces the most publications and “*Turkish Journal of Trauma and Emergency Surgery*” from Türkiye is the eighth most influential journal. In terms of articles on GSW, Türkiye is considered to be in a good position. The limitation of the study is that it was conducted only in the WoS database, and it is recommended that similar studies be conducted in other databases such as Pub Med and Scopus and that the study be repeated by updating the data in the coming years.

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ORİJİNAL ÇALIŞMA - ÖZ

Ateşli silah yaralanması konulu yayınların bibliyometrik analizi, 1980-2022

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AMAÇ: Ateşli silah yaralanmalarına (ASY) bağlı meydana gelen ölümler Türkiye’de ve yurt dışında giderek artarak önemli bir halk sağlığı problemi olmuştur. Bu çalışmada ASY konusundaki makalelerin bibliyometrik analizinin yapılması amaçlanmıştır.

GEREÇ VE YÖNTEM: Araştırma kapsamında Web of Science (WoS) veri tabanında Bibliometrix programı ile incelemeler yapılmıştır. Gunshot wound, gunshot injuries, gunshot injury, firearm wound, firearm injuries, firearm injury kelimeleri anahtar kelime olarak kullanılmıştır.

BULGULAR: Yapılan analiz sonucunda 1980-2022 yılları arasında 479 farklı dergide yayınlanan 1236 makaleye ulaşıldı. Makalelerin yıllık büyüme oranı %6.69, makale başına ortalama atıf 9.78 idi. Amerika Birleşik Devletleri (ABD) (n=562, %45.4), Türkiye (n=102, %8.25) ve Hindistan (n=42, %3.4) yayın performansı en yüksek üç ülke idi. Güney Afrika’dan Elias Degiannis ve Roger Saadia, ABD’den C. William Schwab en etkili ilk üç araştırmacıdır. Türkiye kökenli en etkili araştırmacı ise Ersin Erdogan idi. “Journal of Trauma-Injury Infection and Critical Care”, “American Surgeon” ve “Injury-International Journal of the Care of the Injured” dergileri yayın ve atıf sayıları açısından en etkili ilk üç dergidir. Türkiye kökenli “Ulusal Travma ve Acil Cerrahi Dergisi” en etkili sekizinci dergidir. Atıfları yönüyle en etkili araştırmacının Katherine A Fowler tarafından 2015 yılında Prev Med’de yayınlanan “Firearm injuries in the United States” başlıklı çalışma olduğu bulunmuştur.

SONUÇ: Araştırma sonucunda ASY konusunda çalışmalar yapan araştırmacılar için faydalı bilgiler ortaya çıkarılmıştır. ASY konusundaki ilk kapsamlı bibliyometrik çalışma olması, bu araştırmayı özgün kılmaktadır.

Anahtar sözcükler: Ateşli silah; bibliyometrik analiz; yaralanma.

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