Iranian veterans' health in published researches: a scientometric study

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Research

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Abstract

Background: The wars have several indirect effects on societies. The injured people, veterans, usually need lengthy care, often at great cost. Moreover, caring processes would get more complicated with aging. Therefore, several investigations have to be carried out in order to achieve an appropriate conception of planning the healthcare systems in Iran. The first step is to review the relevant studies on the veterans' health.

Method: On 31 December 2020, through a systematized search in the Scopus, as the largest abstract and citation database of peer reviewed publications, all published articles about veterans affiliated with at least an Iranian researcher as author were retrieved. Full records of retrieved articles, including, author name and affiliation, journal name, citation number, cited references, and keywords, were exported to a file. After data cleaning, the file was used for network analysis using the VOSviewer version 1.6.15.

Results: A total of 276 articles, about the Iranian veterans, were published. 31 articles of Iranian had received at least 31 to maximum 217 citation (H-index = 31). Baqiyatallah University of Medical Sciences and Mashhad University of Medical Sciences were respectively the most productive and cited university of Iran. The three major topics of researches about Iranian veterans' health were psychological outcome, chemical warfare and mustard gas, and PTSD.

Conclusion: However, published research about veterans' health by Iranian research is growing in recent decade, number of publication is low and the topics studied is limited.

Background

War and armed conflict are a sinister human achievement that have historically caused great and often incalculable damages to the parties to the conflict (1–3). War has many indirect effects on societies. The injured people, veterans, usually need lengthy care, often at great cost.(2, 3). Moreover, caring processes would get more complicated with aging.

The Iraq-Iran war has caused many deaths and physical and mental complications among Iranian people (4). In addition to the martyrdom of more than 200,000 Iranians during the war, a large number of Iranians were martyred at the border after the war due to the unexploded ordnance and ammunition (4). Chemical injuries has also been the causes of death of veterans after the war. Some studies are on the mortality and the clinical side-effects of exposure to chemical weapons (4–9). Furthermore, there are published articles about psychological status of veterans and their families.

Global health-related injuries are projected to increase by 2060 and to grow faster in the elderly and low-income countries (10). Considering aging of Iranian veterans, it seems necessary to conduct relevant studies in order to obtain a suitable picture for the planning of health care systems. First step to make the picture is review of the relevant studies on the veterans' health. To our knowledge, there is not any report about the overview of the Iranian veterans' related research. This study aims to evaluate research publications affiliated with Iranian researchers in veterans' related topics through the bibliometrics tools and network analysis. We will provide trends of published articles, received citations, published the highest level of evidence, networks of international collaboration, and clustering major topics in the Iran's researches about veterans.

Method

On 31 December 2020, through a systematized search in the Scopus, as the largest abstract and citation database of peer reviewed publications, all published articles about **veterans** affiliated with at least an Iranian researcher as author were retrieved. In addition, other databases, PUBMED, and Clarivate analytics (formerly ISI), were systematically searched.

A systematized search in the PubMed on December 2020, through the same but modified search strategy used in the Scopus, was conducted for extraction of the study types of the articles about veterans. Due to the some misspecifications of the PubMed filters for determination of the study type we used a comprehensive, sensitive, and combined search strategy to identify the Clinical trials, Randomized clinical trials, systematic reviews and meta-analyses. The search strategy could be find in the Table 1.

Statistical methods:

Full records of retrieved articles, including, author name and affiliation, journal name, citation number, cited references, and keywords, were exported to a file. Also, the rate of international collaboration was calculated. An article with affiliated authors in different countries is considered as an output of the international collaboration. After data cleaning, the file was used for network analysis using the VOSviewer version 1.6.15. In the network maps, the size of the bubbles indicates the number of documents. The bubbles close to each other with the same colors are in the same homogeneous clusters in terms of co-occurrence in the documents. Strength of the relationship is indicated by the lines connect the bubbles.

All statistical analyses were carried out using the Microsoft Excel and statistical package for social sciences (SPSS) version 25. Mean $\pm$ standard deviation (SD) and frequency (percent) were used for description of quantitative and qualitative variables, respectively.

Results

A total of 276 articles, about the Iranian veterans, were published in the journals indexed in the Scopus. The same for Clarivate analytics and PubMed was 156 and 193 articles. 31 articles of Iranian had received at least 31 to maximum 217 citation (H-index = 31). The total number of publications (citations) rose from 51 articles (431 citations) in 1996–2009 years to 224 articles (2946 citations) in 2010–2020 years. Figure 1 shows the growth trend of published articles by Iranian researchers about veterans and related received citations. About 20% of articles about veterans were published by only 3 journals, i.e. Journal of Military Medicine (28 articles, 42 citations, H-index = 3), Iranian Journal of War And Public Health (15 articles, 1 citations, H-index = 1), and International Immunopharmacology (10 articles, 97 citations, H-index = 4).

Table 2 shows the top 10 most productive authors, and universities. Baqiyatallah University of Medical Sciences and Mashhad University of Medical Sciences were the most productive (86 articles, 1165 citations, H-index = 19) and the most cited (64 articles, 1404 citations, H-index = 21) university in Iran, respectively. Among the Iranian researchers, Balali-Mood, M. (27 articles), Soroush, M.R. (24 articles), and Ghanei, M. (21 articles) were the authors with the highest number of publications. Iranian authors had the most collaboration with the USA (15 articles) followed by England (9 articles), and Australia (7 articles).

Table 3 shows the top 10 most cited articles about veterans' health by Iranian authors. The most cited article was an assessment of the sulfur mustard and its effects on Iranian veterans, which was published in the Basic and Clinical Pharmacology and Toxicology (Impact Factor = 2.65) in 2006 (11). It had two authors, Balali-Mood, M. and

Hafezi M., and received 219 citations. The most recently article in the list of top 10 most cited was entitled “Improvement of sulphur mustard-induced chronic pruritus, quality of life and antioxidant status by curcumin: Results of a randomised, double-blind, placebo-controlled trial” by Panahi Y et.al. published in the British Journal of Nutrition (Impact Factor = 3.33) in 2012 that received 111 citations (12).

Co-authorship map of authors in the Fig. 2 (Right) revealed clusters of authors that they collaborate with each other in veterans’ health researches. Each bubble indicates an author, and links connected the bubbles indicate collaboration in at least one publication.

Out of the 2672 unique keywords, the top 5 most frequent keywords in the articles were male (160 times), adult (159 times), mustard gas (109 times), middle aged (107 times), and chemical warfare agents (89 times). The four clusters of major topics, denoted by the green, yellow, blue, and red colors, based on the most commonly used terms in the researches related to veterans’ health were mapped in the Fig. 2 (Left). Red colored cluster represented terms related to the psychological related topic, such as “quality of life”, “psychology”, “anxiety”, or “depression”; green and yellow colored cluster represented terms related to chemical warfare and mustard gas, such as “mustard gas”, “gas poisoning”, “skin disease”, or “lung disease”; blue colored cluster represented terms related to PTSD, such as “post-traumatic stress disorder” or “chronic disease”.

Iranian authors published totally 21 of all types of clinical trials (CTs), 12 of all types of review articles (RAs) and just one systematic review about veterans’ health. CTs mostly studied the effects of treatment and education on mustard gas and PTSD related clinical or psychological outcomes. The topics of most of reviews are about chemical warfare and sulfur mustard gas. Two out of 12 reviews studied the psychological aspect of veterans’ life, e.g. quality of life, mental health, and sleep disturbance (13, 14). Figure 3 shows the co-occurrence map of the most frequent keywords used in clinical trials and reviews published about veterans’ health.

Discussion

The present study is a scientometric analysis of the research articles published by Iranian authors about the veterans’ health. This study showed an increasing rate but low number of publications and received citations by Iranian researchers. Also, highest level of evidence, i.e. clinical trials and systematic reviews, are rarely produced about Iranian veterans’ health.

Quality of researches about veterans’ health affiliated with Iranian researchers is improving but not sufficient. Increasing rate of received citations (rose from 431 citations in 1996–2009 to 2946 in 2010–2020) could be considered as an indicators of the research quality. This results is in line with the progression of the other fields of medical sciences in Iran (15, 16).

Evidences have not same values (17). Clinical trials and systematic reviews are in the top level of evidence hierarchy (18). The total number of published clinical trials and systematic review about Iranian veterans’ health were only 21 and 12 articles, respectively. Increasing production of high level evidences could improve policy and decision making about veterans’ health management. Producing low number of high-quality original research in the highest level of evidence might harm the evidence-based veterans’ management and wasting resources over time (19).

Network clustering indicates several distinctive clusters of authors with published articles about veterans’ health. Tend to not expanding research network is reported in the previous studies (20). Although clusters of Iranian

authors work on veterans' health seems to be connected with each other networks, relationships through expanding networks highly recommended to improve research quality, increasing learning and using experiences (20, 21). Balali-Mood, M., Soroush, M.R., and Ghanei, M. were the top 3 authors that produced highest number of published articles and H-index. Baqiatallah University of Medical Sciences was the most productive in terms of total number of published articles (86 article). In terms of total received citations and H-index, Mashhad University of Medical Sciences was ranked first. Against the previous studies, Tehran university of medical sciences was in the 4th rank of the most productive in terms of total number of published articles (37 articles), total number of received citations (425) and highest H-index (H = 11) (15, 16).

Most frequent keywords in the articles were male, adult, mustard gas, middle aged, and chemical warfare. The three major topics of researches Iranian veterans' health were psychological outcome, chemical warfare and mustard gas, and PTSD. There was not same previous researches that explore the topics in the published articles about veterans' health.

Conclusion

However, published research about veterans' health by Iranian research is growing in recent decade, number of publication is low and the topics studied is limited. There are very limited evidence about indirect impact of the war on psychological, social, and familial outcomes among Iranian people. In-addition highest level of evidence is rare. Conducting original researches with focus on clinical trials, supportive and educational interventions are recommended. Till now, Methodological aspects of published research are not studied. Reviewing methodology of previous studies about veterans' health is in our future research plan. It might help the researchers to conduct research more efficient and fill the gaps in existing knowledge.

Abbreviations

PTSD: Post-traumatic stress disorder

CT: Clinical trial

RA: Review article

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

MSM, JA and STH contributed in designed the study, analyzed the data, and interpreted the results, wrote the manuscript drafting. **MZ and KBL** contributed in interpretation the results and wrote the manuscript drafting. The final version was confirmed by all authors for submission

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Tables

Table 1. Search protocol to retrieve relevant published articles				
ID	Database	Search for	Search protocol	# of records
#1	Scopus	veterans' related published research	TITLE-ABS-KEY(war OR warfare OR army OR militar* OR "armed conflict") AND TITLE-ABS-KEY(veteran*) AND AFFIL(iran)	276
#2	Clarivate analytics	veterans' related published research	(TS=(war OR warfare OR army OR militar* OR "armed conflict") AND TS=(veteran*) AND AD=(iran))	156
#3	PubMed	veterans' related published research	((("Warfare and Armed Conflicts"[MESH] OR "Armed Conflicts"[MESH] OR "Military Personnel"[MESH] OR Warfare[MESH] OR war OR warfare OR militar* OR army OR "armed conflict") AND (Veterans[MESH] OR veteran* [tiab])) AND iran[ad])	193
	PubMed	Clinical trial	#3 AND (("clinical trial"[Title/Abstract] OR Clinical Trial[ptyp] OR Clinical Trial, Phase I[ptyp] OR Clinical Trial, Phase II[ptyp] OR Clinical Trial, Phase III[ptyp] OR Clinical Trial, Phase IV[ptyp] OR (Randomized Controlled Trial[ptyp] OR "randomised control trials"[Title/Abstract] OR "randomised control trial"[Title/Abstract] OR "randomized controlled trial"[Title/Abstract] OR "randomized controlled trials"[Title/Abstract])) NOT (Review[ptyp] OR "Review"[ti] OR "meta analysis"[ti] OR "meta-analysis"[ti] OR "Meta-Analysis"[ptyp] OR "Systematic Review"[ti] OR systematic[sb]))	21
	PubMed	All types of review	#3 AND (Review[ptyp] OR "Review*"[ti] OR "meta analysis"[ti] OR "meta-analysis"[ti] OR meta-analy*[ti] OR "Meta-Analysis"[ptyp] OR "Systematic Review*"[ti] OR systematic[sb])	13
	PubMed	Systematic review and meta-analysis	#3 AND ("meta analysis"[ti] OR "meta-analysis"[ti] OR meta-analy*[ti] OR "Meta-Analysis"[ptyp] OR "Systematic Review*"[ti] OR systematic[sb])	1

Table 2. Top 10 most productive authors, universities, and journals in veterans' health; and also, countries with highest rate of collaboration with Iranian authors based on the Scopus database

Rank	Author	TA	TC	H	Journal	TA	TC	H	University	TA	TC	H	Countries	TA	TC	H
1	Balali-Mood, M.	27	831	11	Journal Of Military Medicine	28	42	3	BMSU	86	1165	19	USA	15	226	8
2	Soroush, M.R.	24	345	11	Iranian Journal Of War And Public Health	15	1	1	MUMS	64	1404	21	England	9	127	5
3	Ghanei, M.	21	456	11	International Immunopharmacology	10	97	4	JMERC	52	462	12	Australia	7	57	4
4	Mousavi, B.	16	179	7	Military Medical Research	7	15	2	TUMS	37	425	11	Germany	2	27	2
5	Ghazanfari, T.	14	93	5	Cutaneous And Ocular Toxicology	6	149	5	IUMS	22	90	5	Switzerland	2	27	2
6	Panahi, Y.	14	326	10	Iranian Journal Of Medical Sciences	6	44	3	SBUMS	21	158	7	Malaysia	2	22	2
7	Naghizadeh, M.M.	12	207	9	Basic And Clinical Pharmacology And Toxicology	5	264	3	SU	18	139	7	Canada	2	9	2
8	Mahmoudi, M.	11	438	6	Journal Of Research In Medical Sciences	5	39	3	TMU	17	158	7	Italy	2	8	1
9	Ebadi, A.	11	117	6	Drug And Chemical Toxicology	4	26	3	SUMS	13	448	8	Netherlands	2	5	2
10	Emad, A.	10	417	7	Inhalation Toxicology	4	173	3	IAU	13	80	4	Brazil	2	5	1

TA: total article, TC: total citation, H: H-index.

Table 3. Top 10 most cited articles about veterans' health by the Iranian authors

Rank	First author (# of total authors)	Title	Journal	Year of publication	# of citation
1	Balali-Mood, M. (2)	Comparison of early and late toxic effects of sulfur mustard in Iranian veterans	Basic and Clinical Pharmacology and Toxicology	2006	219
2	Emad, A. (2)	The diversity of the effects of sulfur mustard gas inhalation on respiratory system 10 years after a single, heavy exposure: Analysis of 197 cases	Chest	1997	200
3	Balali-Mood, M. (10)	Long-term complications of sulphur mustard poisoning in severely intoxicated Iranian veterans	Fundamental and Clinical Pharmacology	2005	144
4	Panahi, Y. (7)	Improvement of sulphur mustard-induced chronic pruritus, quality of life and antioxidant status by curcumin: Results of a randomised, double-blind, placebo-controlled trial	British Journal of Nutrition	2012	111
5	Emad, A. (2)	Immunoglobulins and cellular constituents of the BAL fluid of patients with sulfur mustard gas-induced pulmonary fibrosis	Chest	1999	81
6	Aghanouri, R.(6)	Fibrogenic cytokine levels in bronchoalveolar lavage aspirates 15 years after exposure to sulfur mustard	American Journal of Physiology - Lung Cellular and Molecular Physiology	2004	80
7	Hefazi, M. (4)	Late respiratory complications of mustard gas poisoning in Iranian veterans	Inhalation Toxicology	2005	78
8	Mahmoudi, M.(4)	Long-term hematological and immunological complications of sulfur mustard poisoning in Iranian veterans	International Immunopharmacology	2005	73
9	Shohrati, M.(5)	Cutaneous and ocular late complications of sulfur mustard in Iranian veterans	Cutaneous and Ocular Toxicology	2007	70
10	Hefazi, M. (5)	Delayed complications of sulfur mustard poisoning in the skin and the immune system of Iranian veterans 16-20 years after exposure	International Journal of Dermatology	2006	70

Figures

Figure 1

(Left) Research publication with at least an Iranian author indexed in Scopus, Clarivate analytics (ISI), and PubMed;
 (Right) Number of received citations per year, based on Scopus database.