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Original article

## Social network analysis of Iranian researchers in the field of violence

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## ABSTRACT

**Purpose:** The social network analysis (SNA) is a paradigm for analyzing structural patterns in social relations, testing knowledge sharing process and identifying bottlenecks of information flow. The purpose of this study was to determine the status of research in the field of violence in Iran using SNA.

**Methods:** Research population included all the papers with at least one Iranian affiliation published in violence field indexed in SCIE, PubMed and Scopus databases. The co-word maps, co-authorship network and structural holes were drawn using related software. In the next step, the active authors and some measures of our network including degree centrality (DC), closeness, eigenvector, betweenness, density, diameter, compactness and size of the main component were assessed. Likewise, the trend of the published articles was evaluated based on the number of documents and their citations from 1972 to 2014.

**Results:** Five hundred and seventy one records were obtained. The five main clusters and hot spots were mental health, violence, war, psychiatric disorders and suicide. The co-authorship network was complex, tangled and scale free. The top nine authors with cut point role and top ten active authors were identified. The mean (standard deviation) of normalized DC, closeness, eigenvector and betweenness were 0.449 (0.805), 0.609 (0.214), 2.373 (7.353) and 0.338 (1.122), respectively. The density, diameter and mean compactness of our co-authorship network were 0.0494, 3.955 and 0.125, respectively. The main component consisted of 216 nodes that formed 17% of total size of the network. Both the number of the documents and their citations has increased in the field of violence in the recent years.

**Conclusion:** Although the number of the documents has recently increased in the field of violence, the information flow is slow and there are not many relations among the authors in the network. However, the active authors have ability to influence the flow of knowledge within the network.

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## Introduction

The World Health Organization introduced violence as an important public health challenge in 1996. Violence can be divided into three types including self-violence, interpersonal violence and collective violence based on the person/persons who committed the violence.<sup>1</sup> Currently, violence is the cause of 1.5 million deaths annually in the world.<sup>2</sup> More than 8 million people in the United States of America reported violence by their sexual partner in 2012.<sup>3</sup> In developing countries, accurate and sufficient information

related to deaths and injuries caused by violence are not known, but the available data suggest that these countries have more problems regarding this issue.<sup>4</sup>

The social network analysis (SNA) is a paradigm analyzing structural patterns in social relations, providing the methods to explain and test knowledge sharing process and identifying bottlenecks of information flow.

Considering network theory, social networks such as co-authorship network have formed a set of nodes (researchers) and links (relations between individuals). Each node has a special place in the network and the extent of participation is specified by the number of links which authors establish together.

Co-authorship social networks can identify researchers in a particular field of work. Also, these networks explain and draw researchers' extent of collaboration and their impact on the scientific community.

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Using this method, the establishment of new academic disciplines, research teams and centers for research investment and policy decision-making are provided.

Nowadays, the status of research in the field of violence is not clear in our country. Hence, forming a research team to conduct systematic studies in this field is not possible.

Numerous studies have already conducted SNA and co-authorship network in medicine.<sup>5–16</sup> However, it seems that few studies have been done in the field of violence particularly in Iran.

Frank et al<sup>17</sup> reviewed the published articles in the field of violence in 2010. They collected their data from MEDLINE, PsycINFO, LILACS and SciELO databases. Of the 176 published articles, 84% were English and 49.4% were in biomedical journals. 42% of studies were conducted in North America. Most papers focused on healthcare services. The authors proposed effective policies to reduce violence.

Likewise, Rodríguez Franco et al<sup>18</sup> examined domestic violence in a bibliometric study in 2009. The purpose of the study was to investigate the number of articles, the year of publications, the relationships of victims-perpetrators and the most active authors.

The aim of present study was to identify the status of scientific outputs of Iranian researchers in the field of violence using SNA. So, we intended to identify the main clusters and hot topics, co-authorship network, structural holes, active authors, and in next step, we were going to analyze the structural indices of our network and evaluate the trend of the published articles based on the number of documents and their citations in the field of violence from 1972 to 2014.

## Materials and methods

Research population included all the papers with at least one Iranian affiliation published in violence field indexed in SCIE, PubMed and Scopus databases. Ravar Matrix and Netdraw software was used to map the co-authorship network and structural holes. Also, VOSviewer software was used to draw co-word maps. In the next step, the active authors and some measures of our network including degree centrality (DC), closeness, eigenvector, and betweenness were evaluated. Then, some other measures of social network analysis such as density, diameter, compactness, and size

of main component and cut-points were assessed. Likewise, the trend of the published articles was evaluated based on the number of documents and their citations from 1972 to 2014. Following search strategy was used to collect data separately for PubMed and Scopus databases and wholly for ISI database, respectively.

ti = (Violence OR assault\* OR offens\* OR rape OR conflic\* OR war OR suicid\* OR homicid\* OR tolerance OR aggressi\* OR self-infliction OR self-mutilation OR genital mutilation OR coercion OR threatened OR repression OR genocid\* OR deprivati\* OR battered OR bullying OR refugee OR firearm OR gang OR harassment OR human right OR fight OR victim) and cu = (Iran).

## Results

We identified 1316, 545 and 327 records through ISI, PubMed and Scopus databases searching, respectively. After removing duplicated results, 760 of records were remained.

Since some of the key words were interdisciplinary, a lot of records were irrelevant to our study. Consequently, the titles of articles were reviewed again by a violence and injury expert and those irrelevant documents were excluded. Finally, 571 records were obtained and the final analysis was performed on the data.

First of all, we reviewed active authors who published more paper in the field of violence in Iran. Soroush, Rezaeian, Ghanei, Nojumi and Ghazanfari were the top authors who published 23, 20, 20, 12 and 12 papers, respectively.

Figs. 1 and 2 show label view of clusters and hot spots in the field of violence using co-word maps designed by VOSviewer software. In the label view, each color represents a separate cluster and the sizes of circles are the clusters with high weight which are located as head clusters. The hot spots are in red colors and if there is high distance from the center of gravity, the color will be changed, indicating that they are far from hot topics and the integrated clusters will be changed to non-integrated ones. As illustrated in Figs. 1 and 2, the five main clusters and hot spots were mental health, violence, war, psychiatric disorders and suicide.

Fig. 3 shows the researchers' co-authorship network in the field of violence in Iran. The network is complex and tangled. This network consisted of 4 dyadic components, 7 triad components, 10 quadr components, 1 component with 6 nodes, 1 component with 7 nodes and 1 component with 14 nodes. The main component

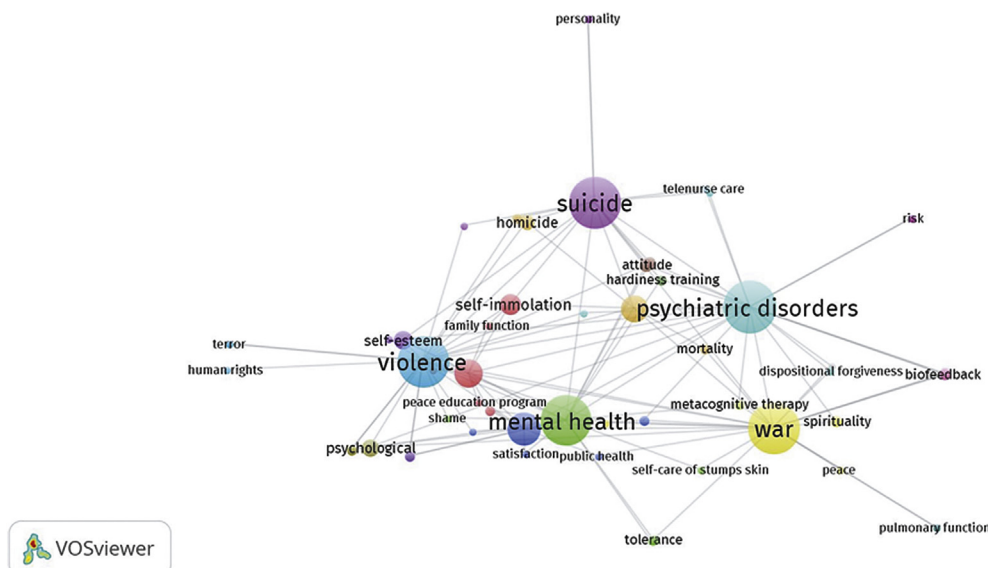


Fig. 1. Label view of the published articles in the field of violence in Iran domain.

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