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Measuring the global research landscape on nonviolence (*Ahiṃsā*) over three decades (1991–2021)

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Abstract

This study employs bibliometric methods to measure the productivity of authors, organizations, and countries engaged in research on nonviolence according to preferred channels for dissemination, composition of collaborative teams, and overall research performance based on data drawn from the Elsevier Scopus database. The researchers identify three major developmental stages of nonviolence research over the course of three decades (1991–2021) and found that annual research productivity in nonviolence research has grown at a slow pace in stage 1 (1991–2000), at a moderate pace in stage 2 (2001–2010), and at a fast pace in stage 3 (2011–2021). Based on the keyword frequency and their co-occurrence relationships, three major topical theme clusters emerged; the first theme cluster relates to religion and spirituality, the second theme cluster relates to nonviolence, peace, and conflict, and the third theme cluster relates to political tactics, law, and social movements. Authorship patterns in nonviolence research show a single authorship trend as most of the publications have been published by single authors (71.57%).

INTRODUCTION

Scholars over many decades have traced currents of nonviolent practices across time and region, yet there is still no clear consensus within this literature on the definition and necessary

characteristics of nonviolence as a phenomenon. The absence of nonviolence within humanities and social science research taxonomies poses a cyclical problem for peace researchers. Currently, both qualitative and quantitative measures of the impact of specific lines of research are among the greatest determinants of that topic's perceived value within the academic landscape. Journals, monographs, and other scholarly outputs do not measure themselves; however, scholars of nonviolence will find very little data on the impact of their research field, not because it lacks significance, but because it has not been subject to measurement.

This study charts the impact of nonviolence studies through bibliometric methodologies that provide statistical and structural analyses for inferring trends in the literature over time.[1,2] Bibliometric analysis has become increasingly vital for scholars in all disciplines as the volume of publications has swelled at an accelerating rate in the digital age. The term "bibliometric" was first used by Alan Pritchard in 1969 to refer to the quantitative study of bibliographic materials.[3,4] It is a useful construct for describing emerging developments in a particular research field by identifying nascent changes in the boundaries of the disciplines.[5] Bibliometric methods provide a clear comparative view of areas that have received extensive coverage alongside those that have not. Such measures increasingly shaped decision-making for research funding and policymaking in areas related to peacemaking and human security.[6,7] It is therefore vital to the future of research on nonviolence to provide clear, actionable data to the research community, their institutions, and their funders, so they can make decisions that will make the field increasingly robust as the need for such research intensifies.[8]

One measure of particular concern to peace studies stakeholders is research productivity, which measures how a work of research performs and how efficiently or effectively the resources invested in the research were utilized as expressed in output/input ratios.[9] Bibliometric researchers have found network analysis to be particularly effective in evaluating the importance of nodes and revealing different types of network structures such as co-authorship networks, co-citation networks, and bibliographic coupling networks.[10,11,12,13] The present investigation is the first attempt to analyze the research progress and to examine the collaborative patterns of authors, institutions, and countries in the field of "nonviolence." It therefore seeks to bridge the research gap and evaluate the collaborative networks using knowledge mapping techniques. Our findings reveal the thematic evolution of the research nonviolence and give academics, policymakers, and stakeholders a bird's-eye view of the seminal publications. Designing data analyses of this type can pave the way for conducting bibliometric analysis with other evaluation criteria determining the current research trends across peace studies based on various sets of quantitative and qualitative metrics. Within the expanding literature, the present study brings clarity to longer research patterns and current trends, allowing a data-driven projection into the next areas of peace research

Defining nonviolence

The first step toward measuring research productivity in the area of nonviolence is to define what researchers mean by "nonviolence." While it clearly involves commitments to abstain from the use of injurious force against another being, these commitments have, in various contexts, been religious, social, and/or overtly political. The concept of nonviolence, as ultimately elaborated by Mohandas Gandhi, inherited the meanings of earlier terms non-resistance and derived from the Sanskrit word *ahiṃsā*' (nonviolence) means "not to injure." The term first appeared in *Chandogya Upanishad*[14,15] and is noted as a virtue in the Shrimad Bhagwad Gita. Nonviolence

itself is one of the seven states that have arisen from God, forming the very core of humanity (Shrimad Bhagwad Gita, Chapter 10, verse 5). Nonviolence is one of the 26 aspects of the divine wealth as stated in Shrimad Bhagwad Gita, Chapter 16, verse 2. Nonviolence has been represented as one of the necessary characteristics for cultivating knowledge of *"the Self"* or the *"Brahmana"* that permeates all beings (Shrimad Bhagwad Gita, Chapter 13, verses 7–10).[16,17]

Nonviolence has deep universal roots in spirituality and the ancient wisdom traditions.[18] Different religions—whether Hinduism, Buddhism, Jainism, or Christianity—have strongly advocated the strict adherence to universal principles of nonviolence, peace, and love, with each formulating various theoretical and theological bases for religious practices.[19] Various Indian teachers of morality and religion have taught nonviolence as their highest virtue. The Jains consider nonviolence the cornerstone of their ethical system. Its adherence to "absolute truth," makes living in a state of nonviolence necessary for advancing toward the Jainist path of liberation (Tattvartha Sutra, 2). In Buddhism, nonviolence extends from restraint from harming others ("non-killing," or "non-injury") to organizing one's thoughts around compassion.[20] The Christian idea of nonviolence is encapsulated in the concept of "agape," in which in Greek means love, which is self-giving, and asks nothing in return for its goodwill. Christianity holds that by acting nonviolently toward his enemy, and even loving "the enemy," one transmits God's power and self-giving love into human life, and by being the transmitter gains the power of "agape" to change his enemy into a friend.[21]

Nonviolence in practice clearly differs from the popular perception that it is a simple refusal to use violence.[22] It is a system of reasoning that requires the practitioner to accept the consequences of any violent action he or she might take. It requires self-inquiry into the causes of the violence, their own participation in creating these conditions, and into the changes they must help make to do away with the systems of structural violence that set the conditions for the use of violence. If a practitioner of nonviolence is assaulted, they must resist striking back or harboring ill will. Instead, they must work to dismantle the structures that created the confrontation; structural change entails long series of political, social, cultural, economic, and spiritual acts, and not just a refusal to lash out.

Nonviolent movements, though forged in historically specific dynamics of suffering and perseverance, do share common characteristics that make the term definable for the purpose of taxonomic categorization.[23,24] Mohandas Karamchand Gandhi applied the principle of nonviolence in all spheres of life and demonstrated its power in his successful political opposition to racial discrimination, injustice, and exploitation. His revolutionary impact on India influenced 20th-century leaders across the globe, including Nelson Mandela, James Bevel, and Martin Luther King, Jr., who drew upon Gandhian practices of nonviolent resistance. Across the globe, activists used Gandhian political tools, which included abstaining from violence and hostility, gaining the confidence of the adversary, truth-telling, adhering to fairness in all things, humanizing the adversary by refusing to humiliate them, making nonviolent activists' sacrifices visible, and extending patience and a belief in the opponent's capacity for change.[25]

Pope John Paul II defined nonviolence in 1985 in Guatemala as "an active commitment to active justice" in circumstances in which one feels as though they lack political agency. Tom Walz and Heather Ritchie (2000)[26] defined nonviolence as "a process of self-introspection and leveraging one's internal resources" where one lacks the typical external sources of power such as wealth, political influence, or weapons.[27]

Nonviolence, far from just an idea or a personal discipline, is a comprehensive political strategy of principled nonviolent action that humanizes the adversary. It requires time and discipline to build a resilient force of activists committed to fostering human potential to enacting the

core human values of forgiveness, love, trust, empathy, compassion, and mutual respect—all of which are cornerstones to sustainable peace and, ultimately, the protection of human rights.[28,29] Although its practice has taken many forms, the four hallmarks of nonviolence are the rejection of violence, a search for truth, respect for the dignity of the adversary through engagement in dialogue and listening, and creating alternative modes of thought and being that disrupt systems of power that make violence an effective political instrument.

Review of related bibliometric studies

A limited number of bibliometric studies related to the "peace" field have been carried out to date. The analysis of large bodies of related literature provides a starting place for this and future analyses of the literature in peace studies.[30] Ayyoob Sharifi, Dahlia Simangan, and Shinji Kaneko (2021)[31] in a scientometric study of the literature emphasized the need for future research to focus on linkages between peace and sustainability by under-examined subjects, geographic regions, and sectors. Pedro Pineda, Jorge Celis, and Lina Rangel (2019)[32] analyzed 685 documents on peace education retrieved from the Scopus database spanning 1970 to 2018. The results indicated that peace education emerged in 1970 in the scientific databases, lost its momentum in 1990, and further globalized after the year 2003. Jesus Palomo, Cristina Figueroa-Domecq, and Pilar Laguna (2017)[33] conducted a bibliometric analysis of 321 articles on "women, peace and security" extracted from the Scopus database from 1918 to 2013 covering 95 years, which showed high dispersion of the literature in terms of authors and journals. The resultant data also indicated a low level of collaboration among authors and institutions.

A sizable corpus of research has been produced over the last three decades on the linkages between climate change and situations that threaten negative peace. Ayyoob Sharifi, Dahlia Simangan, and Shinji Kaneko (2021)[34] used VOSviewer and SciMAT software tools for science mapping and bibliometrics analysis to examine 1337 publications indexed in the Web of Science in order to close a research gap on this nexus and increase understanding. Using the SciMAT program, the thematic evolution of the nexus was investigated across the three sub-periods 1990–2007, 2008–2014, and 2015–2020. The first period (1990–2007) established the field's structure around three key themes: "war," "migration," and "risk." The second era (2008–2014) revealed that the field's thematic focus has changed to include "civil war," "conflict," and "risk." The third period (2015–2020) kept focusing on "climate change" and "civil war." In general, the "war" thematic area focused mostly on the linkages between climatic change, conflict, and human security.

Isolating and analyzing the causes of conflict as well as the variables that help to maintain the existing level of nonviolence is the productive mission of peace research. Many social scientists believe that humanity has reached a critical point in its history where all aspects of human activity are intimately connected to one central concern, namely how to uphold peace and prevent conflict. Therefore, rather than creating a priori constructs of an ideal state of affairs, peace research should focus on inferring the structure of a potential world from already apparent patterns. Peace research should avoid the temptation to construct prescriptive moral, ethical, logical, or legal theories and instead focus on rigorous observation of the mechanisms that ensure the absence of conflict—particularly during intervals when tensions are high.[35,36]

Research objectives

The main objective of this study is to measure the global research landscape in the field of nonviolence as reflected in the publications output over a 31-year period spanning from 1991 to 2021. The specific objectives of the study are:

1. To examine the distribution of research productivity by types of documents, sources, and languages;
2. To identify the average growth rate (AGR), compound average growth rate (CAGR), relative growth rate (RGR), and doubling time (DT);
3. To examine the degree of collaboration (DC), collaboration index (CI), collaboration coefficient (CC), and modified collaboration coefficient (MCC);
4. To identify the collaborative trends in nonviolence research;
5. To identify the contributions of the prolific authors, journals, institutions, and countries in nonviolence research; and
6. To identify the prominent research themes using the analysis of the keywords.

MATERIAL AND METHODOLOGY

The bibliometric method has been adopted to measure the global research landscape on nonviolence (Ahiṃsā) during the last three decades (1991–2021). The Elsevier Scopus database—one of the largest curated, data-enriched abstract and citation databases linked to scholarly literature across a variety of disciplines—was used as a tool to extract the bibliographic data of the publications. The coverage of the Scopus database is global, including titles from all geographical regions. Approximately 86% of titles in Scopus are published in the English language, and about 22% of titles are published in languages other than English, presenting about 40 local languages.[37] The data between the periods 1991 and 2021 were downloaded from the Scopus database on May 10, 2022, for analysis based on preset query sets. The exported data included document type, author(s), countries, institutions, sources, year of publications, citations, disciplines, and funding agencies.

Keywords selection

The study employed a comprehensive search strategy for the optimum recall and precision of the data set on the topic. By using the advance search box of the Scopus database, the search strategy included terms "nonviolence" OR "non-violence" OR "non violence" based on literature review, analysis of terms from the Scopus database, and prior knowledge.

Data retrieval and inclusion/exclusion criteria

The process of data selection, extraction, and filtration is depicted in Figure 1 and is based on a four-phase model of data selection, eligibility, screening, and finalization used successfully in recent bibliometric studies.[38,39,40,41] The protocol for this study was adapted to remove document type and language filters. In the first phase, identification, the initial Scopus comprehensive

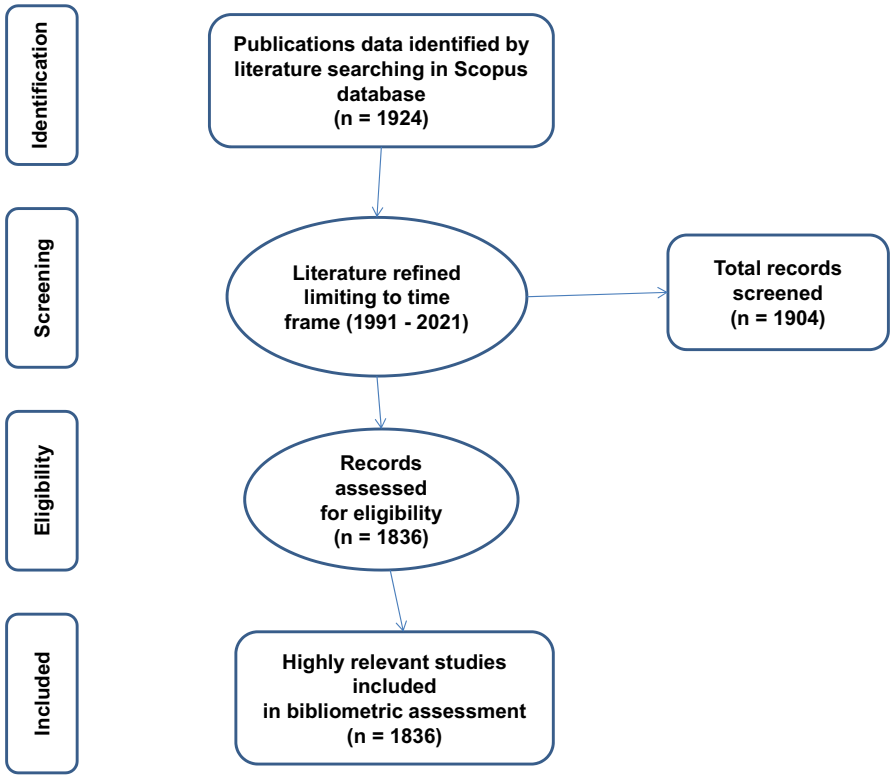

FIGURE 1 Four-phase flow chart of data extraction and filtration process

search strategy extracted 1924 records. In the second phase, screening, to retrieve the potential publication records, the data files were exported into Microsoft Excel and the records were thoroughly screened. After filtering, the irrelevant and duplicate records were removed toward ensuring accountability and accuracy of the data. In the third phase, eligibility, 1836 records were considered eligible and finalized for inclusion in the data to be interpreted in the results.

Data analysis

The data retrieved from Scopus were exported to Microsoft Excel and BibExcel for mathematical and statistical analysis. Modern visualization tools Biblioshiny and VOSviewer version 1.6.18 were used for the mapping, with bibliometric indicators serving as the basis for analysis.

VOSViewer is a software tool that visualization scientific landscapes based on several techniques like co-authorship analysis, co-occurrence analysis, citation analysis, bibliographic coupling, and co-citation analysis, etc.[42] Biblioshiny, a shiny app that offers a web interface from RStudio, was also used for network research and visualization. It supports researchers in data importing, data conversion, data gathering, data filtering, and analytics and plots for sources, authors, documents, and clustering by coupling.[43] The study has also made use of analytical provisions such as journal-level metrics, author metrics, and article-level metrics available in the Scopus database to demonstrate the outcome in a form that makes it easier to comprehend the research output and trends.

TABLE 1 Research productivity and citation impact

Time span	TNP	%TNP	TNC	%TNC	CPP
1991	8	0.44	0	0	0
1992	3	0.16	0	0	0
1993	8	0.44	4	0.03	0.5
1994	6	0.33	2	0.01	0.33
1995	12	0.65	5	0.03	0.42
1996	12	0.65	6	0.04	0.50
1997	9	0.49	18	0.12	2.00
1998	13	0.71	25	0.17	1.92
1999	18	0.98	30	0.21	1.67
2000	19	1.04	45	0.31	2.37
2001	16	0.87	55	0.38	3.44
2002	22	1.19	59	0.41	2.68
2003	38	2.07	105	0.72	2.76
2004	23	1.25	111	0.77	4.83
2005	26	1.42	130	0.89	5.00
2006	30	1.63	167	1.15	5.57
2007	55	3.00	173	1.19	3.15
2008	52	2.83	275	1.89	5.29
2009	57	3.11	340	2.34	5.97
2010	77	4.19	371	2.56	4.82
2011	84	4.58	487	3.36	5.79
2012	98	5.34	677	4.67	6.91
2013	90	4.90	761	5.25	8.46
2014	102	5.56	847	5.84	8.30
2015	131	7.14	1051	7.24	8.02
2016	115	6.26	1062	7.32	9.24
2017	133	7.24	1224	8.44	9.20
2018	171	9.31	1346	9.28	7.87
2019	134	7.29	1285	8.86	9.59
2020	131	7.14	1421	9.79	10.85
2021	143	7.79	2428	16.73	16.98
Total	1836	100	14,510	100	7.90

Abbreviations: CPP, citations per paper; TNC, total number of citations; TNP, total number of publications.

RESULTS AND DISCUSSION

Research productivity and citation impact

During the last three decades, the topic of nonviolence has shown a high degree of interest among researchers across the globe. Table 1 demonstrates the chronological global research productivity

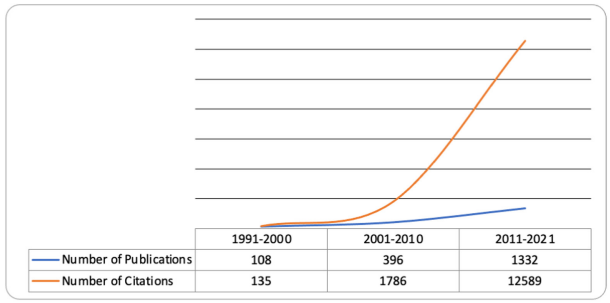

FIGURE 2 Distribution of research productivity during three decades

and the impact of citations during the study period from 1991 to 2021. A total of 1836 publications on nonviolence have been produced over the past three decades, with an average of 59 publications per year. These publications have received 14,510 citations with an average of 7.90 citations per publication (CPP). Figure 2 outline the chronological distribution of the number of publications and number of citations during the study period from 1991 to 2021. Based on the annual research productivity, the nonviolence research has been divided into three stages:

1. Stage 1: 1991–2000, the nonviolence research output has grown at a slow pace;
2. Stage 2: 2001–2010, the nonviolence research output has grown at a moderate pace; and
3. Stage 3: 2011–2021, the nonviolence research output has grown at a fast pace.

It revealed that the research productivity in nonviolence increased considerably from the year 2014 onward and has shown increasing trends in the year-on-year publications output. The maximum number of publications has been produced in the year 2021. Consequently, a similar pattern has been seen in the citation count (Table 1; Figure 2).

CPP is the simplest ratio between total citations credit to the total publications produced and can be expressed as:

$$\text{CPP} = \frac{\text{Total citations received}}{\text{Total publications published}}$$

Growth patterns

The global research output in nonviolence registered an overall annual average growth rate (AGR) of 20.17% and 9.75% of the compound annual average growth rate (CAGR). AGR is a measure of the annual increase or decrease growth of the number of publications in a particular discipline. The CAGR is the ratio of growth of publication output in a given period. The calculated values demonstrate that the annual average growth rate of productivity is inconsistent. The highest growth rate (166.67%) was observed in the year 1993 (Table 2).

The following equation is used for calculating the AGR:

$$r = \frac{P1 - P0}{P0} \times 100$$

where r = publication growth in percentage, $P0$ = number of publications in the base year, $P1$ = number of publications in the present year.

The following equation is used to calculate the compound average growth rate (CAGR):

TABLE 2 Growth patterns

Time span	TNP	TNA	AGR	AAPP	PPA
1991	8	9	100	1.125	0.89
1992	3	3	−62.5	1.00	1.00
1993	8	12	166.67	1.50	0.67
1994	6	9	−25	1.50	0.67
1995	12	12	100	1.00	1.00
1996	12	21	0	1.75	0.57
1997	9	10	−25	1.11	0.9
1998	13	22	44.44	1.69	0.59
1999	18	23	38.46	1.28	0.78
2000	19	25	5.56	1.32	0.76
2001	16	28	−15.79	1.75	0.57
2002	22	43	37.5	1.96	0.51
2003	38	50	72.73	1.32	0.76
2004	23	34	−39.47	1.48	0.68
2005	26	40	13.04	1.54	0.65
2006	30	35	15.39	1.17	0.86
2007	55	70	83.33	1.27	0.79
2008	52	74	−5.45	1.42	0.70
2009	57	64	9.62	1.12	0.89
2010	77	130	35.09	1.69	0.59
2011	84	131	9.09	1.56	0.64
2012	98	148	16.67	1.51	0.66
2013	90	129	−8.16	1.43	0.69
2014	102	144	13.33	1.41	0.71
2015	131	205	28.43	1.57	0.64
2016	115	182	−12.21	1.58	0.63
2017	133	212	15.65	1.54	0.63
2018	171	283	28.57	1.65	0.60
2019	134	245	−21.64	1.83	0.55
2020	131	246	−2.23	1.88	0.53
2021	143	265	9.16	1.85	0.54
Total	1836	2904	625.28	1.48	0.69

Abbreviations: AAPP, average author per paper; CPP, citations per paper; PPA, productivity per author; TNA, total number of authors; TNP, total number of publications.

$$\mathrm{CAGR} = \left(V_{\mathrm{final}}/V_{\mathrm{begin}}\right)^{1/t} - 1$$

where CAGR = compound average growth rate, V_{begin} = beginning value, V_{final} = final value, t = time in years.

In order to investigate the growth pattern, the study has also calculated the average number of authors per paper (AAPP) and productivity per author (PPA). It revealed that the highest number of authors' productivity was found in 2018 (283). Of the retrieved documents, it has been inferred from the data that the mean AAPP and PPA were 1.48 and 0.69, respectively.

The AAPP and PPA values were calculated using the following equation[44]:

$$\text{AAPP} = \frac{\text{Number of authors}}{\text{Number of publications}}$$

$$\text{PPA} = \frac{\text{Number of publications}}{\text{Number of authors}}$$

Relative growth rate and doubling time of publications

Relative growth rate (RGR) is a measure to study the increase in the number of publications per unit of time over a specific period of the interval and is calculated using the following equation[45]:

$$\text{RGR} = \frac{\ln N2 - \ln N1}{t2 - t1}$$

where Log N_1 = natural log of the initial number of publication. Log N_2 = natural log of the final number of publication. $t_2 - t_1$ = unit difference between the initial and final time.

On the contrary, doubling time (DT) refers to the time required for the publication to double in existing number and is calculated using the following equation:

$$\text{DT} = \frac{\ln 2}{\text{RGR}}$$

The RGR for the global research productivity decreased constantly from the rate of 0.55 to 0.08. At the same time, DT of research productivity for the nonviolence displays an increasing trend from the rate of 1.26 to 8.67. Therefore, it is inferred from the data that the relative growth of publications decreased, resulting in an increase in the corresponding doubling time of publications. The mean RGR and DT of nonviolence research for the period of 31 years were reported to be 0.18 and 4.49, respectively (Table 3).

Most productive authors

The prominence of "publish or perish" in academia requires researchers to consistently publish their research output to enhance their impact and maintain the growth of publications across the globe. If research in nonviolence is to thrive, it is imperative that contributions by authors in nonviolence are visible to international readerships. A sizable number of authors ($n = 2904$) had contributed unevenly to global research productivity. Table 4 lists the ten most productive authors along with CPP and RCI values. For the purposes of this study, the category "most productive authors" includes the authors who produced the greatest number of publications within the data set. These top ten authors have contributed 3.49% ($n = 64$) publications of the overall research output with fetching 3.24% ($n = 470$) citations. The remaining research output was produced by

TABLE 3 Relative growth rate and doubling time of publications

Time span	TNP	Cumulative	Natural log	RGR	DT
1991	8	8	2.08	–	
1992	3	11	2.39	0.31	2.24
1993	8	19	2.94	0.55	1.26
1994	6	25	3.22	0.28	2.48
1995	12	37	3.61	0.39	1.78
1996	12	49	3.89	0.28	2.48
1997	9	58	4.06	0.17	4.08
1998	13	71	4.26	0.20	3.47
1999	18	89	4.49	0.23	3.02
2000	19	108	4.69	0.20	3.47
2001	16	124	4.82	0.13	5.34
2002	22	146	4.98	0.16	4.34
2003	38	184	5.22	0.24	2.89
2004	23	207	5.33	0.11	6.31
2005	26	233	5.45	0.12	5.78
2006	30	263	5.57	0.12	5.78
2007	55	318	5.76	0.19	3.65
2008	52	370	5.91	0.15	4.62
2009	57	427	6.06	0.15	4.62
2010	77	504	6.22	0.16	4.34
2011	84	588	6.38	0.16	4.34
2012	98	686	6.53	0.15	4.62
2013	90	776	6.66	0.13	5.34
2014	102	878	6.78	0.12	5.78
2015	131	1009	6.92	0.14	4.95
2016	115	1124	7.03	0.11	6.31
2017	133	1257	7.14	0.11	6.31
2018	171	1428	7.26	0.12	5.78
2019	134	1562	7.35	0.09	7.71
2020	131	1693	7.43	0.08	8.67
2021	143	1836	7.52	0.09	7.71
Total	1836	–	–	0.18	4.49

Abbreviations: DT, doubling time; RGR, relative growth rate; TNP, total number of publications.

the rest 2894 authors. The top ten authors' productivity varied between 5≥and 12 publications per author. International co-authorship patterns appear notably weak, suggesting international collaboration as an important corrective for the field.

In specific terms, the resultant data revealed that Albert D. Farrell of Virginia Commonwealth University in the United States with a proportion of 0.65% ($n = 12$) produced the highest number of publications, followed by Ramin Jahanbegloo of York University, Canada, accounting

TABLE 4 Most productive authors

Most productive authors	Affiliation	TNP	%TNP	TNC	%TNC	CPP	RCI	h-Index
Farrell A.D.	Virginia Commonwealth University, United States	12	0.65	313	2.16	26.08	3.30	38
Jahanbegloo R.	York University, Canada	7	0.38	4	0.03	0.57	0.07	3
Amster R.	Georgetown University, United States	6	0.33	1	0.01	0.17	0.02	6
Baldoli R.	University College London, United Kingdom	6	0.33	12	0.08	2.00	0.25	2
Gallo-Cruz S.	College of the Holy Cross, United States	6	0.33	10	0.07	1.67	0.21	4
Martin B.	University of Wollongong, Australia	6	0.33	53	0.37	8.83	1.12	19
Škof L.	Institute for Philosophical Studies, Slovenia	6	0.33	6	0.04	1.00	0.13	3
Abu-Nimer M.	American University, United States	5	0.27	66	0.46	13.20	1.67	8
Fiala A.	California State University, United States	5	0.27	3	0.02	0.60	0.08	4
Lal, V.	University of California, United States	5	0.27	43	0.29	8.60	1.07	8
Total		64	3.49	470	3.24	7.34	0.93	

Abbreviations: CCP, citations per paper; RCI, relative citation impact; TLS, total link strength; TNC, total number of citations; TNP, total number of publications.

for 0.38% publications ($n = 7$) of the total nonviolence research output. To measure the research productivity and citation impact of authors, the study has used an h-index author-level metric. The h-index, also known as the say Hirsch index, integrates both quantity and visibility of publications in terms of single-number criterion.[46] Farrell's output has the highest h-index value (38), followed by Martin with an h-index of 19. Among the 10 most productive authors, six are from the United States, and one each from the United Kingdom, Canada, Australia, and Slovenia. The present study has also tried to identify the CPP and RCI of these authors. RCI is an indicator (developed by Thomas Reuters of the Institute of Scientific Information) used to measure the impact of research productivity of nations/institutions/authors/journals. The authors having RCI < 1 implies that the research output was not commensurate with their impact, whereas authors having RCI > 1 indicates high-impact research. In terms of CPP and RCI, the highest value is observed for Farrell with 26.08 (CPP) and 3.30 (RCI) respectively (Table 4).

RCI can be expressed as:

$$\text{RCI} = \frac{\text{Share of global citations}}{\text{Share of global publications}}$$

Lotka's law was used to assess the productivity pattern of the author in a data sample. According to Lotka's law, "the number of authors making x contribution in a given time is a fraction of making a single contribution".[47,48] According to Lotka's law, it is evident that as the number of articles rises, the number of authors decreases. There are three possible interpretations of the analysis, the most prolific authors, the authors who are most frequently cited, and the years of publications that they published (Figure 3).

Co-authorship networks of authors

The co-authorship network of authors is visually depicted in Figure 4. The type of network visualization analysis used was "co-authorship," the unit of analysis was used "authors," and "full counting" was used as the counting method of the VOS viewer for creating the authors' network

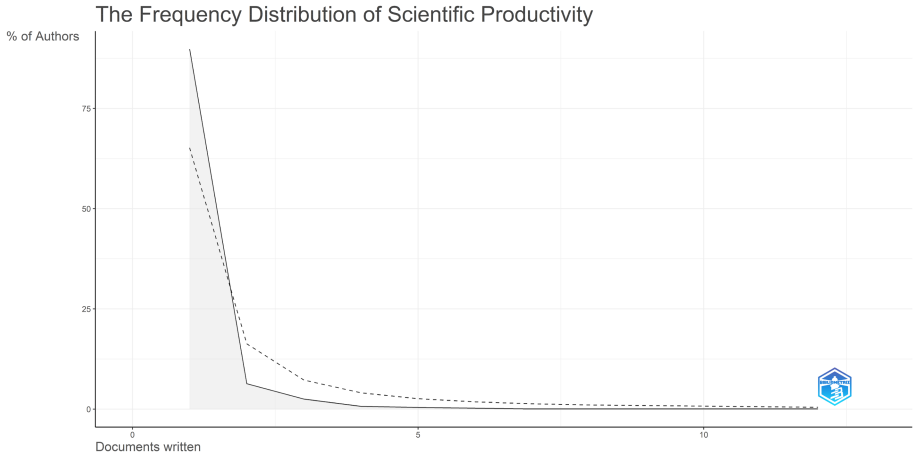

FIGURE 3 Lotka's law-compliant production patterns for authors

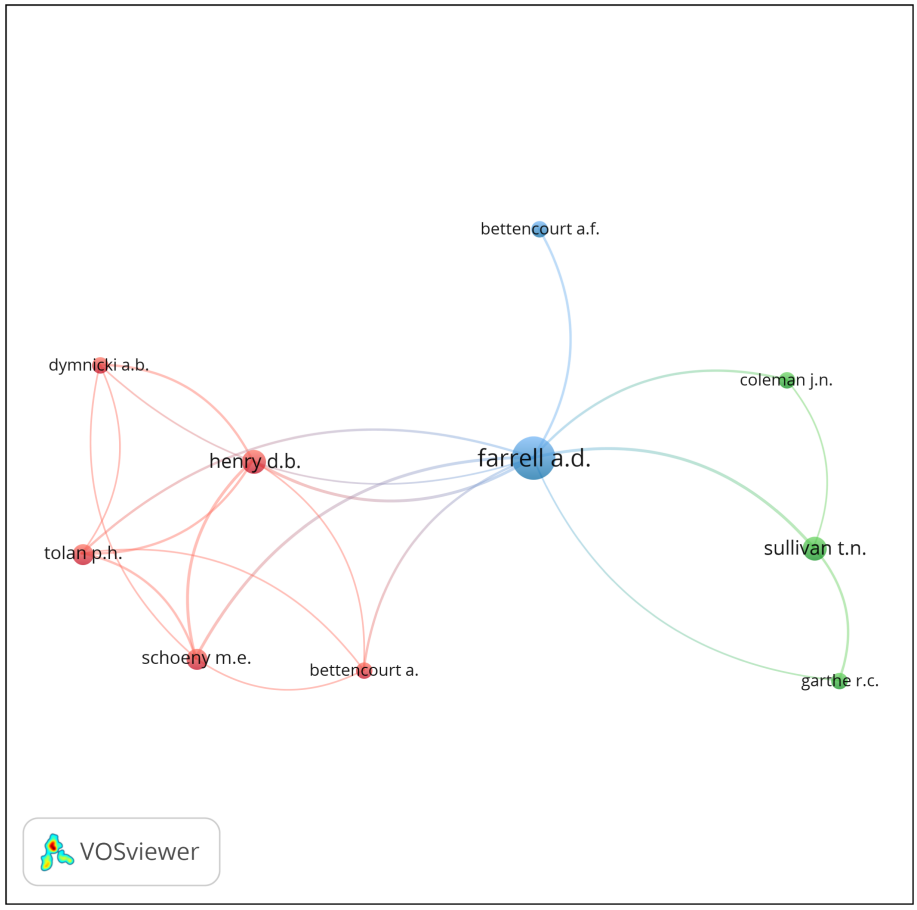

FIGURE 4 Co-authorship networks of authors

visualization. The map has been created with a threshold of a minimum of 2 documents per author and out of the total 2904 authors, 250 meet the criteria. However, only 10 of them are seen to be connected in terms of collaboration. These 10 authors have been distributed among three clusters, colored differently, with 20 links and a TLS of 36. Cluster 1, colored in red, is seen as the largest among all, consisting of five authors: Bettencount, Dymnicki, Henry, Schoeny, and Tolan. The prominent author in this cluster is Henry with 4 documents, 5 links, and a TLS of 11. The author has seen to be in strong collaboration with Schoeny with a TLS of 3. Cluster 2, colored in green, consists of three authors: Coleman, Garthe, and Sullivan. Cluster 3, colored in blue, consists of two authors: Bettencourt and Farrell. Overall, author Farrell is the most prominent author with 12 documents, 9 links, and a TLS of 19 (Figure 4).

This network analysis is useful to consider in light of findings that the greater the authors on a research study, the better the quality of publications,[49] which increases the chances of a research manuscript being accepted for publication[50] and, ultimately, of being cited.[51,52] These are important considerations for peace studies and the mainstreaming of nonviolence into cross-disciplinary research.

TABLE 5 Most productive countries

Most productive countries	TNP	%TNP	TNC	%TNC	CPP	RCI	TLS
United States	734	39.98	7937	54.70	10.81	1.37	86
United Kingdom	190	10.35	1729	11.92	9.10	1.15	57
India	92	5.01	362	2.49	3.94	0.49	25
Australia	81	4.41	566	3.90	6.99	0.88	24
Canada	74	4.03	761	5.25	10.28	1.30	16
Germany	43	2.34	213	1.47	4.95	0.63	9
South Africa	43	2.34	309	2.13	7.19	0.91	12
Russian Federation	42	2.29	58	0.39	1.38	0.18	1
Brazil	26	1.42	119	0.82	4.58	0.58	12
France	24	1.31	25	0.17	1.04	0.13	17
Total	1349	73.48	12,079	83.25	8.95	1.13	

Abbreviations: CCP, citations per paper; RCI, relative citation impact; TLS, total link strength; TNC, total number of citations; TNP, total number of publications.

Most productive countries

Table 5 lists the ten most productive countries along with their CPP and RCI values. The countries that produced the maximum number of publications have been categorized as the most productive countries. The data show that research in nonviolence that yields publications has gathered momentum during the last three decades across disciplines and regions of the world. In all, a total of 112 countries contributed unevenly to global nonviolence research. The countries were ranked in descending order according to their total publications on nonviolence. The top ten countries' productivity ranging between and $24 \geq 734$ publications reflect the major contributions in nonviolence research. The United States has the highest number of publications with a total of 734 publications accounting for 39.98% of the total publications in this field, which is marginally higher than the others. It is relevant to mention that the United States is the bellwether in nonviolence-related research. The United Kingdom ranked second with a proportion of 10.35% ($n = 190$) publications of the total output. These top ten countries in the aggregate published about 73.48% ($n = 1349$) publications of the total research output and garnered 83.25% ($n = 12{,}079$) citations of the total with a CPP of 8.95. Based on total citations received and in terms of influence, the United States emerges as the most productive country with the highest 54.70% ($n = 7937$) citations of the total, followed by the United Kingdom at 11.92% ($n = 1729$). In terms of CPP and RCI, the United States again stands far ahead with CPP (10.81) and RCI (1.37). The countries having RCI < 1 imply that the research output was not commensurate with their impact, whereas countries having RCI > 1 indicate the high impact of research (Table 5). The concentrated number of publications by these top ten productive countries suggests that these countries have greater advantages than the others. Identifying these advantages will present opportunities to bring a wider range of work from a broader international community into the literature.

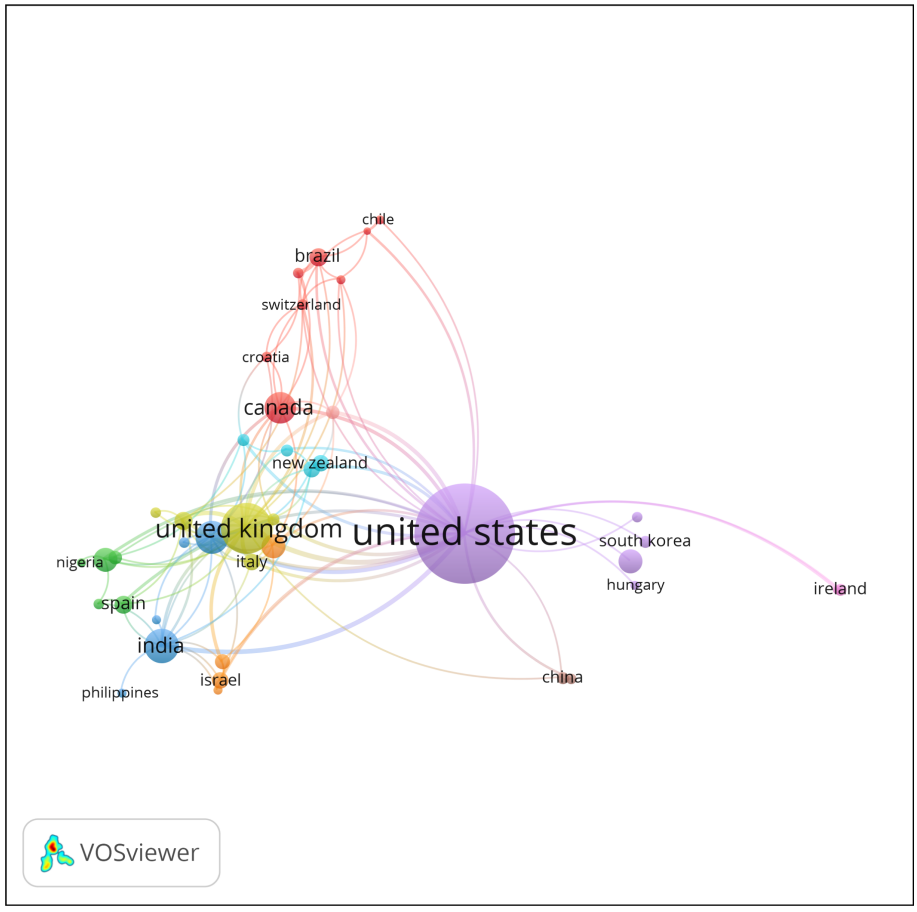

FIGURE 5 Collaborative networks of countries

Collaborative networks of countries

The strength of collaboration among the countries has been visually depicted in Figure 5. The type of network visualization analysis used was "co-authorship,"the unit of analysis was used "countries," and "full counting" was used as the counting method of VOS viewer for creating the countries network visualization. The map has been created with a minimum threshold of 5 documents per country; out of the total 112 countries, 44 meet the criteria. However, only 41 of them show connections between collaborators. These 41 countries have been distributed among ten clusters, colored differently, having a total of 117 links and a TLS of 195. The largest cluster, colored in purple, constitutes the network of 8 countries. The most prominent country was the United States with 734 documents, 30 links, and a TLS of 75. Figure 6 demonstrates the country collaboration map on nonviolence research domain (Figure 5: Figure 6).

Most productive organizations

This study found that 2143 organizations published research on nonviolence. The number of documents produced by the organizations and the citations received demonstrate the impact of

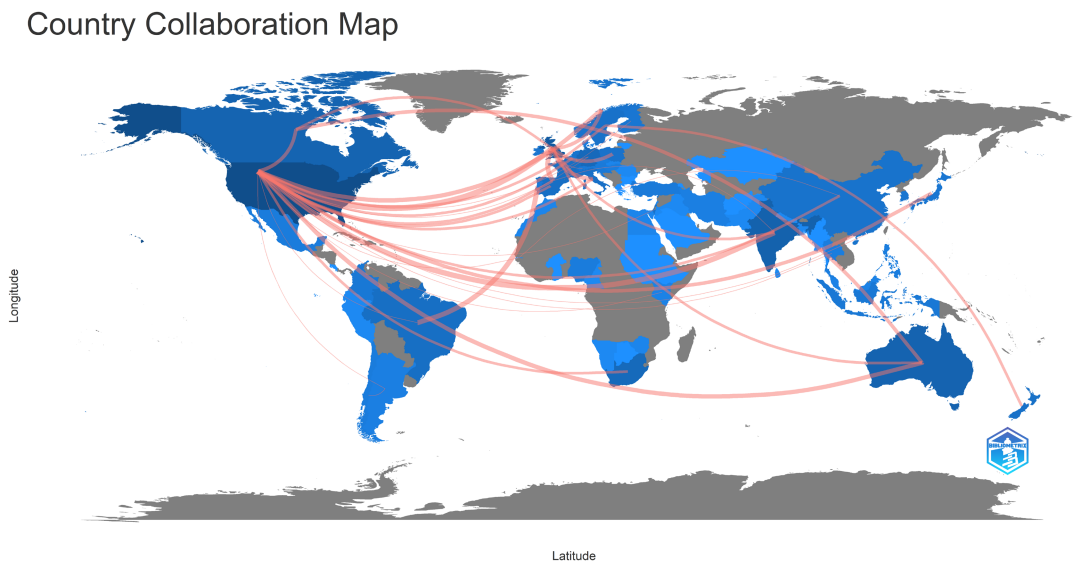

FIGURE 6 Country collaboration map

TABLE 6 Most productive organizations

Most productive organization	TNP	%TNP	TNC	%TNC	CPP	RCI	TLS
Georgetown University, United States	6	0.33	1	0.01	0.17	0.02	3
McGill University, Canada	6	0.33	30	0.21	5	0.63	0
University of Chicago, United States	6	0.33	63	0.43	10.5	1.33	2
California State University, United States	5	0.27	3	0.02	0.6	0.08	2
University of Otago, New Zealand	5	0.27	24	0.17	4.8	0.61	0
University of Oxford, United Kingdom	5	0.27	12	0.08	2.4	0.30	0
Virginia Commonwealth University, United States	4	0.22	136	0.94	34	4.30	1
George Mason University, United States	4	0.22	1	0.01	0.25	0.03	4
Newcastle University, United Kingdom	4	0.22	18	0.12	4.5	0.57	2
University of California, Berkeley, United States	4	0.22	2	0.01	0.5	0.06	2
Total	49	2.67	290	1.99	5.92	0.75	

Abbreviations: CCP, citations per paper; RCI, relative citation impact; TLS, total link strength; TNC, total number of citations; TNP, total number of publications.

the most productive organization.[53,54] Table 6 names the most productive organizations in terms of maximum publications. The top ten productive organizations together dominate the research field accounting for 2.67% ($n = 49$) of global publications with an average citation score of 5.92.

The aggregate global research output of the top ten organizations spans from 4 to 6 publications. Among these top productive organizations, six are in the United States; two in the United Kingdom, one in Canada, and one in New Zealand. On the measure of highest documents produced, the top three contributing organizations are Georgetown University, McGill University, and the University of Chicago with 6 publications per institution. Based on the number of citations, Virginia Commonwealth University, United States, stands first with 136 citations. In terms of CPP, the University of Chicago stands first with 10.5, and in terms of RCI; Virginia Commonwealth University exhibits the highest value of 4.30. The organizations having RCI <1 imply that the research output was not commensurate with their impact, whereas organizations having RCI >1 indicate a high research impact (Table 6).

The network among the organizations has been visually depicted in Figure 7. The type of network visualization analysis was used "co-authorship," the unit of analysis used was "organizations," and "full counting" was used as the counting method of VOS viewer for creating the organizations' network visualization. The map has been created with a threshold of a minimum of 2 documents per organization; out of the total 2143 organizations, 131 met the criteria. However, only 5 organizations are seen to be connected in terms of collaboration. These 5 organizations are distributed among two clusters, colored differently, having a total of 4 links (Figure 7).

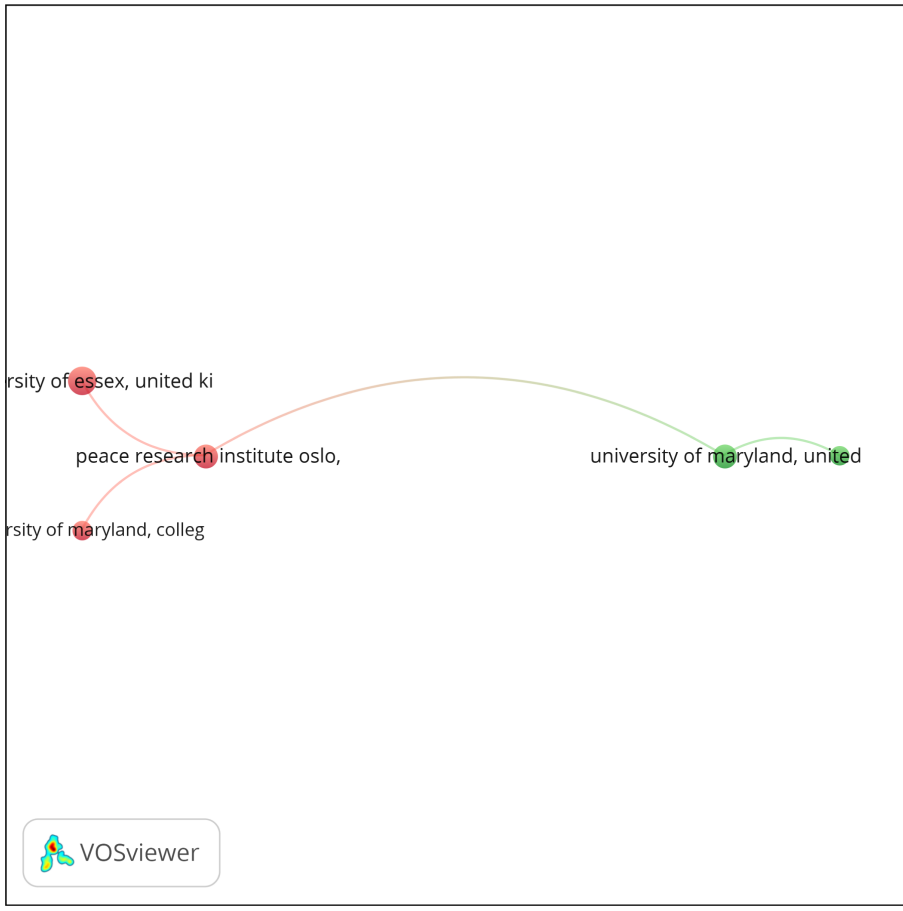

FIGURE 7 Collaborative networks of organizations

Most productive outlets

The analysis related to the most preferred outlets for publication of research on nonviolence in terms of their quantitative factors is depicted in Table 7. Publications on research in nonviolence were produced in journals ($n = 1331$), books ($n = 431$), book series ($n = 53$), and conference proceedings ($n = 21$). The ten most prolific outlets have produced 7.63% ($n = 140$) of the total publications and garnered 5.41% ($n = 785$) of total citations. The Source Normalized Impact per Paper (SNIP) data for the year 2020 were retrieved from the Scopus database to measure journal impact and provide accurate comparability between the journals. The study has also retrieved the Field-Weighted Citation Impact (FWCI) and CiteScore 2020 from Scopus. CiteScore is an annual value that measures the citation impact of journals focusing on typically peer-reviewed publications only. FWCI is the ratio of the document's citations to the average number of citations received by all similar documents over a three-year window.

The resultant data suggest that the most productive journal was the *Journal of Peace Research* (Sage Publications) with a proportion of 1.14% ($n = 21$) publications and received the highest citations accounting for 4.11% ($n = 596$) of the total counts. The highest values of CPP (28.38) and RCI (3.59) are also observed in the *Journal of Peace Research*. In terms of CiteScore (2020) and SNIP (2020), the journal also exhibits the highest with 5.9 and 2.673 respectively. The sources having RCI < 1 imply that the research output was not proportional to their impact, whereas RCI > 1 indicates the high impact of research (Table 7). Of note is the collection of essays in *The Routledge Handbook of Pacifism and Nonviolence* edited by Andrew Fiala of Fresno State University, the United States, with a proportion of 1.09% ($n = 20$) publications share, which speaks to the merits of publishing edited volumes.

Citation analysis of key journals

The network visualization map of journals was created through VOS viewer to identify the journals that produced the highest number of publications on nonviolence. In the analysis criteria, "citation" was chosen as the type of analysis, and "source" was chosen as the unit of analysis in the full counting method for the said purpose. For a journal to be included in this data set, it had to meet a minimum threshold of 5 publications. A total of 43 met this threshold. Of these, only 14 journals showed collaborative connections, yielding 6 clusters with 18 links and a TLS of 52. These data give a clear picture of the interrelatedness of research journals. The distance between the two journals represents the relatedness in terms of their co-citations. The influence of each journal on the field of nonviolence research is indicated by the relative size of each circle and its accompanying label (Figure 8).

Bradford's Law was used in order to determine the core journals in the field of study. According to the law, "if the scientific journals are organized in the order of decreasing productivity of articles on a given subject, they may be divided into the nucleus of periodicals more specifically devoted to the subject and several groups or zones containing the same number of articles as the nucleus, when the number of periodicals in the nucleus and the succeeding zones will be as 1: n: n^2 ...."[55,56,57] The journals are distributed exactly as Bradford's law described is depicted in Figure 9.

TABLE 7 Most productive outlets

Most productive outlets	TNP	%TNP	TNC	%TNC	CPP	RCI	CiteScore/ FWCI (2020)	SNIP (2020)
Journal of Peace Research (Sage)	21	1.14	596	4.11	28.38	3.59	5.9	2.673
The Routledge Handbook of Pacifism and Nonviolence (Book; Fresno State University, United States)	20	1.09	7	0.05	0.35	0.04	0.63	NA
Encyclopedia of Violence, Peace, and Conflict (Book; University of Texas, Austin, United States)	18	0.98	37	0.26	2.06	0.26	NA	NA
Religions (Multidisciplinary Digital Publishing Institute [MDPI])	15	0.82	13	0.09	0.87	0.11	0.7	0.744
Journal of Peace Education (Taylor & Francis)	13	0.71	46	0.32	3.54	0.45	1.5	0.985
Economic and Political Weekly (Sameeksha Trust)	11	0.59	5	0.04	0.46	0.06	0.6	0.719
Religion, Terrorism and Globalization. Nonviolence: A New Agenda (Book; Columbia University, New York, United States)	11	0.59	11	0.08	1.00	0.13	NA	NA
Research in Social Movements, Conflicts and Change (Emerald)	11	0.59	60	0.41	5.46	0.69	1.3	0.820
HTS Teologiese Studies/*Theological Studies* (Open Journals Publishing AOSIS [Pty] Ltd)	10	0.55	10	0.07	1.00	0.13	0.6	0.906
Nonviolence in the World's Religions: A Concise Introduction (Elizabethtown College, United States)	10	0.55	0	0	0	0	NA	NA
Total	140	7.63	785	5.41	5.61	0.71		

Abbreviations: CPP, citations per paper; FWCI, Field-Weighted Citation Impact; RCI, relative citation impact; SNIP, source normalized impact per paper (Source: Scopus); TLS, total link strength; TNC, total number of citations; TNP, total number of publications.

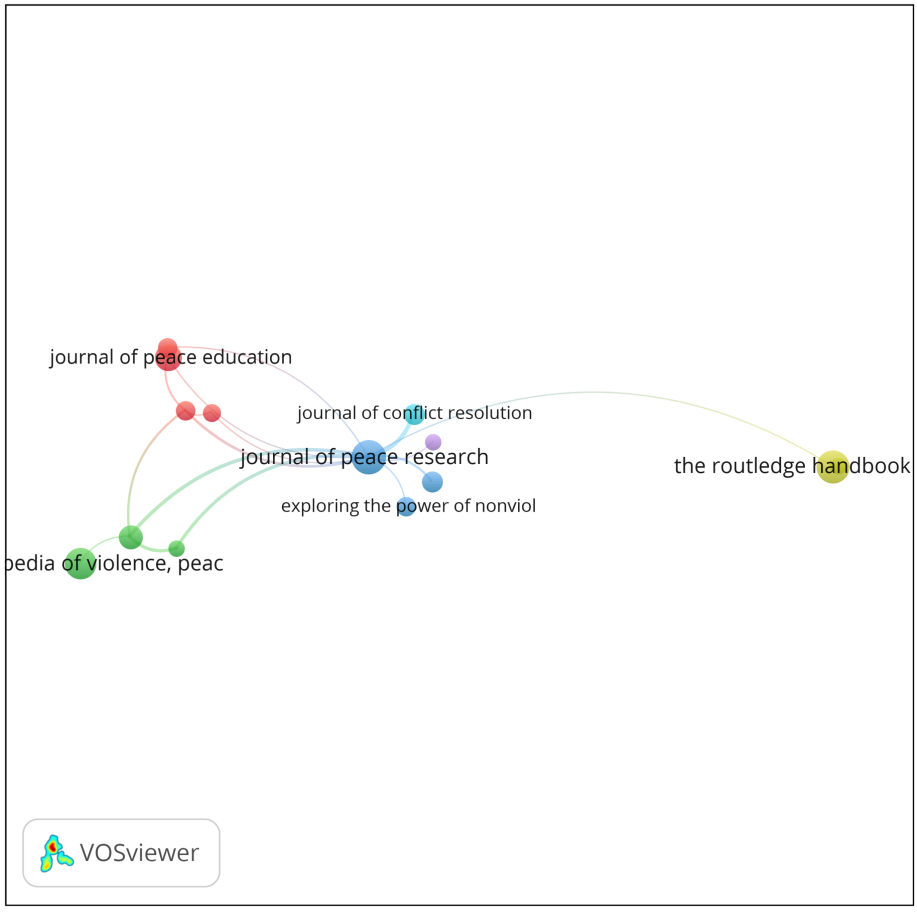

FIGURE 8 Citation analysis of sources

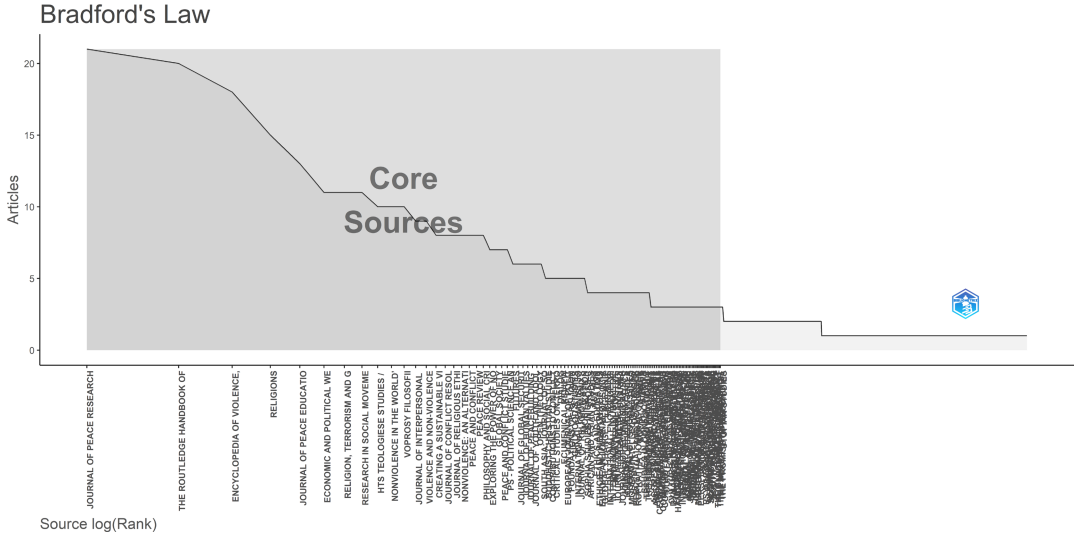

FIGURE 9 Journal distribution in accordance with Bradford's law

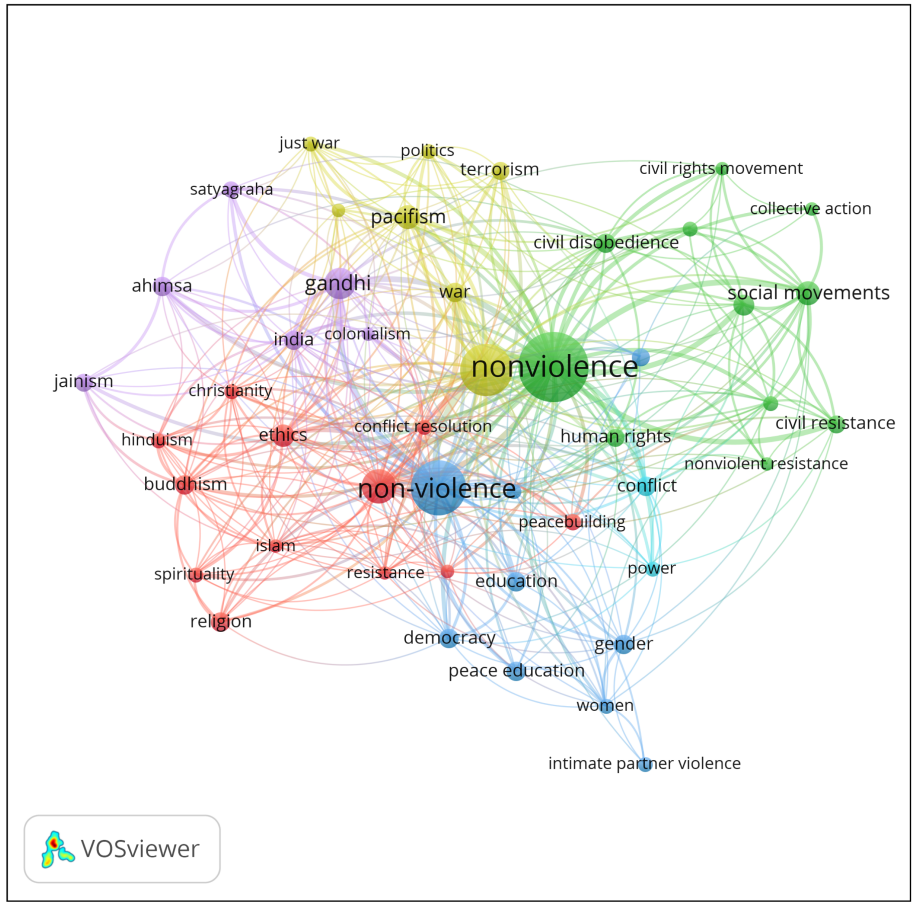

FIGURE 10 Research topical themes derived from author keywords

Research topical themes derived from author keywords

In order to identify the intellectual structure of literature on nonviolence, VOSviewer software was used to extract the keywords provided by the authors to highlight their research. The analysis identified 3595 author keywords in the sample data. To measure the frequency of keywords in the nonviolence literature, a minimum threshold of ten occurrences was set, yielding a list of 47 most frequently used terms as shown in Figure 10. The average publication year factor indicates the extent to which a keyword is in current use and the average citations factor indicates the average number of citations under which a keyword appears. The most frequent keywords in this data set included nonviolence (frequency = 270), nonviolence (frequency = 169), violence (frequency = 147), and peace (frequency = 63) (Table 8). Based on the keyword frequency and their co-occurrence relationships, three major topical theme clusters emerged:

1. The first theme cluster relates to religion and spirituality, including theology, theories, and practices with representative terms such as Buddhism, Christianity, Hinduism, Islam, Jainism, religion, and spirituality.

TABLE 8 Research topical themes derived from author keywords

Keywords	Occurrences	Links	TLS	Avg. pub. year	Avg. citations
Nonviolence	270	45	368	2015.46	5.10
Non-Violence	169	40	180	2015.52	8.02
Violence	147	37	176	2013.73	9.08
Peace	63	33	114	2014.67	7.97
Gandhi	52	28	101	2015.02	2.29
Social Movement	33	18	69	2015.52	10.45
Pacifism	33	19	67	2017.42	2.48
Ethics	30	25	65	2012.87	7.37
Protest	26	16	53	2017.58	7.54
Religion	23	12	27	2016.00	2.17
Education	23	11	24	2014.61	3.57
War	23	16	51	2013.43	13.00
India	23	23	49	2015.48	8.78
Conflict	23	18	46	2013.78	10.78
Civil Disobedience	21	17	40	2015.62	6.90
Buddhism	20	22	43	2015.15	8.55
Democracy	20	16	34	2015.70	2.90
Gender	20	14	25	2013.95	15.75
Peace Education	20	8	15	2015.55	3.05
Ahimsa	20	16	39	2015.70	2.70
Civil Resistance	18	12	38	2016.89	21.06
Human Rights	17	14	30	2010.88	11.71
Aggression	17	8	13	2013.29	20.06
Terrorism	17	14	27	2017.00	16.18
Jainism	17	10	27	2015.06	1.59
Satyagraha	16	11	34	2014.88	0.88
Peace Building	15	11	22	2015.60	6.60
Hinduism	14	17	37	2012.29	4.79
Revolution	14	15	39	2014.36	3.71
Intimate Partner Violence	14	4	6	2015.86	25.07
Conflict Resolution	13	23	36	2012.54	3.23
Repression	13	8	24	2015.77	8.00
Justice	13	17	25	2014.38	5.77
Women	13	16	28	2011.46	6.38
Politics	13	13	26	2015.85	5.08
Power	13	11	23	2011.85	8.15
Christianity	12	19	34	2016.67	1.17

(Continues)

TABLE 8 (Continued)

Keywords	Occurrences	Links	TLS	Avg. pub. year	Avg. citations
Spirituality	12	14	26	2013.17	4.50
Just War	12	15	30	2016.25	1.83
Islam	11	19	30	2013.73	1.27
Resistance	11	17	25	2017.82	1.00
Civil Rights Movement	11	10	24	2013.73	5.09
Nonviolence Resistance	11	7	12	2018.00	1.09
Nationalism	11	12	15	2015.82	4.00
Colonialism	11	16	25	2015.36	1.45
Reconciliation	10	16	22	2014.00	2.80
Collective Action	10	5	14	2015.00	12.70

Abbreviation: TLS, total link strength.

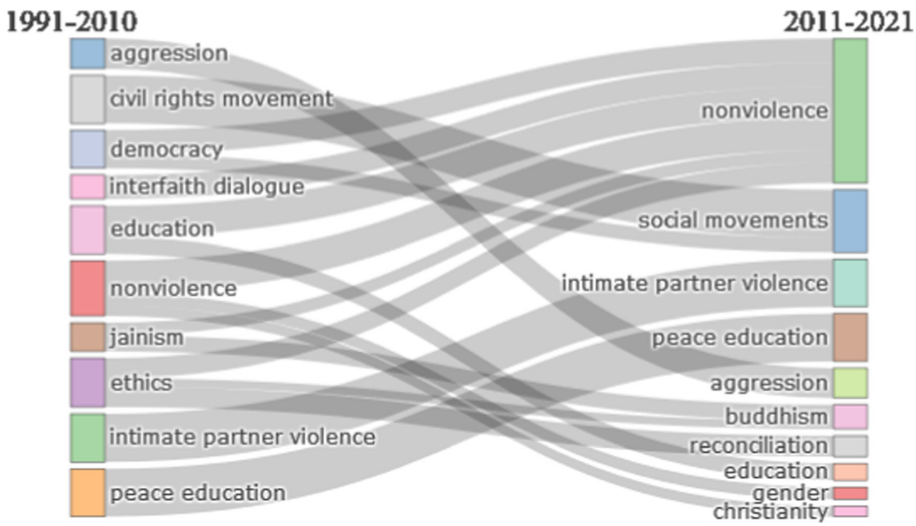

FIGURE 11 Thematic evolution of the author keywords

2. The second theme cluster relates to nonviolence, peace, and conflict theories and practices with representative terms such as nonviolence, ahimsa, satyagraha, nonviolence resistance, conflict resolution, ethics, peace, peace building, peace education, reconciliation, resistance, protest, repression, and revolution.
3. The third theme cluster relates to political tactics, law, and social movement theories and practices with representative terms such as civil disobedience, civil resistance, civil rights movement, collective action, human rights, social movement, democracy, and justice.

Figure 11 demonstrates the thematic evaluation of author's keywords employed in the nonviolence field of research. Over the decades, "Nonviolence" and "Peace Education" have remained a prominent research topic.

TABLE 9 Authorship collaboration

Year	TNP	Single-authored papers	Two-authored papers	Three-authored papers	Four-authored papers	≥Five-authored papers	DC	CI	CC	MCC
1991	8	7	1	0	0	0	0.13	1.12	0.06	0.07
1992	3	3	0	0	0	0	0.00	1.00	00	00
1993	8	6	0	2	0	0	0.25	1.50	0.17	0.19
1994	6	4	1	1	0	0	0.33	1.50	0.19	0.23
1995	12	12	0	0	0	0	0.00	1.00	00	00
1996	12	8	2	0	1	1	0.33	1.75	0.21	0.23
1997	9	8	1	0	0	0	0.11	1.11	0.06	0.07
1998	13	7	4	1	1	0	0.46	1.69	0.26	0.28
1999	18	15	1	2	0	0	0.17	1.28	0.11	0.12
2000	19	15	3	0	1	0	0.21	1.32	0.12	0.13
2001	16	9	4	2	0	1	0.44	1.75	0.26	0.28
2002	22	16	1	2	0	3	0.27	1.96	0.20	0.21
2003	38	31	5	0	1	1	0.18	1.32	0.11	0.12
2004	23	15	6	1	1	0	0.35	1.48	0.19	0.21
2005	26	17	6	2	0	1	0.35	1.54	0.20	0.21
2006	30	27	1	2	0	0	0.10	1.17	0.07	0.07
2007	55	45	7	1	2	0	0.18	1.27	0.11	0.11
2008	52	37	11	3	0	1	0.29	1.42	0.16	0.16
2009	57	52	4	0	1	0	0.09	1.12	0.05	0.05
2010	77	54	6	8	5	4	0.29	1.69	0.20	0.20
2011	84	57	17	4	4	2	0.32	1.56	0.19	0.19
2012	98	76	10	4	3	5	0.23	1.51	0.14	0.14
2013	90	66	12	9	3	0	0.27	1.43	0.16	0.16

(Continues)

TABLE 9 (Continued)

Year	TNP	Single-authored papers	Two-authored papers	Three-authored papers	Four-authored papers	≥Five-authored papers	DC	CI	CC	MCC
2014	102	82	11	4	1	4	0.19	1.41	0.12	0.12
2015	131	96	17	9	5	4	0.27	1.57	0.17	0.17
2016	115	82	18	7	5	3	0.29	1.58	0.17	0.17
2017	133	88	20	20	3	2	0.34	1.59	0.21	0.21
2018	171	123	22	12	6	8	0.28	1.66	0.18	0.18
2019	134	90	20	9	4	11	0.33	1.81	0.21	0.21
2020	131	83	26	5	6	11	0.37	1.86	0.23	0.23
2021	143	83	37	8	8	7	0.42	1.85	0.25	0.25
Total	1836	1314	274	118	61	69	0.25	1.48	0.15	0.16

Abbreviations: CC, collaboration coefficient; CI, collaboration index; DC, degree of collaboration; MCC, modified collaboration coefficient.

Collaborative authorship

In order to measure collaboration patterns among authors, the study has used the degree of collaboration (DC), collaboration index (CI), collaboration coefficient (CC), and modified collaboration coefficient (MCC) methods.[58] DC is defined as "the ratio of the number of collaborative publications to the number of publications in a given field during a particular period of time." Put simply, it is the percentage of the collaborative publications. The following equation is used to calculate the DC:

$$\text{Degree of collaboration (DC)} = \frac{\text{Nm}}{\text{Nm} + \text{Ns}}.$$

where DC = degree of collaboration, Nm = number of multiple-authored research papers, Ns = number of single-authored research papers.

CI is a measure of the mean number of authors, and it neither lies between 0 and 1 nor is expressible in terms of percentage. The following equation is used to count the CI:

$$\text{CI} = \frac{\sum_{j=1}^{A} jfj}{N}$$

where j = number of authors in an article. fj = number of j authored articles. N = total number of articles published in a year. A = total number of authors per article.

CC is another indicator that vanishes for a collection of single-authored papers and distinguishes between single-authored, two-authored, three-authored, etc., papers. However, it fails to yield 1 for maximal collaboration, except when the number of authors is infinite.[59] The following equation is used to count the CC:

$$\text{CC} = 1 - \frac{\sum_{j=1}^{A} \left(\frac{1}{j}\right) fj}{N}$$

MCC is a measure for quantifying the degree of research collaboration. The following equation is used to count the MCC:

$$\text{MCC} = \left(\frac{N}{N-1}\right)\left\{1 - \frac{\sum_{j=1}^{A} \left(\frac{1}{j}\right) fj}{N}\right\}$$

The analysis reveals that authorship patterns in nonviolence research show a strong single authorship trend. In all, a total of 71.57% of the publications are credited to just one author, with only 28.43% having multiple authors. The findings are in line with the results of Nadeem Siddique et al. (2021).[60] The resultant data inferred that the magnitude and density of collaborative patterns among the authors are low. It has been calculated from the data that the DC (0.46) is the maximum in the year 1998. The mean value of DC during the selected period of study is 0.25. The calculated values show that the CI is highest in the year 2002 (1.96). The mean value of CI during the study period is 1.48. The analysis demonstrates that the highest

TABLE 10 Highly cited publications

Top 10 highly cited publications	Authors	Source: Journal/book	Year	TNC	TNC per year
The geography of ethnic violence: Identity, interests, and the indivisibility of territory(Book)	Toft, M.D.	*The Geography of Ethnic Violence: Identity, Interests, and the Indivisibility of Territory*	2010	427	35.58
Trauma and PTSD symptoms in Rwanda: Implications for attitudes toward justice and reconciliation	Pham, P.N., Weinstein, H.M., Longman, T.	*Journal of the American Medical Association*, 292(5), pp. 602–612	2004	254	14.11
What terrorists really want: Terrorist motives and counterterrorism strategy	Abrahms, M.	*International Security*, 32(4), pp. 78–105	2008	226	16.14
Conflict resolution and peer mediation programs in elementary and secondary schools: A review of the research	Johnson, D.W., Johnson, R.T.	*Review of Educational Research*, 66(4), pp. 459–506	1996	207	7.96
Voices of strength and resistance: A contextual and longitudinal analysis of women's responses to battering	Campbell, J., Rose, L., Joan, K., Nedd, D.	*Journal of Interpersonal Violence*, 13(6), pp. 743–762	1998	206	8.58
Democracy, Power, Genocide, and Mass Murder	Rummel, R.J.	*Journal of Conflict Resolution*, *39(1), pp. 3–26*	1995	176	6.52
Evaluating batterer counseling programs: A difficult task showing some effects and implications	Gondolf, E.W.	Aggression and Violent Behavior, 9(6), pp. 605–631	2004	160	8.89
Peace: A history of movements and ideas (Book)	Cortright, D.	*Peace: A History of Movements and Ideas*, pp. 1–376	2008	150	10.71
Exposure to war crimes and implications for peace building in northern Uganda	Vinck, P., Pham, P.N., Stover, E., Weinstein, H.M.	*Journal of the American Medical Association*, 298(5), pp. 543–554	2007	147	9.80
Violence sits in places? Cultural practice, neoliberal rationalism, and virulent imaginative geographies	Springer, S.	*Political Geography*, 30(2), pp. 90–98	2011	132	12.00

value of CC was found in the years 1998 and 2001 (0.26). The mean value of CC during the study period is 0.15. The calculated values show that the highest value of MCC was recorded in the years 1998 and 2001 (0.28). The figures show that the mean value of MCC during the selected period is 0.16 (Table 9).

Highly cited documents

Table 10 recorded the 10 most cited publications in nonviolence registered citations between 132 ≥ 427 citations. The citation per year (CPY) is calculated to overcome the problem encountered during the variation of citations. The CPY is the average number of citations fetched in a particular period. Highly cited papers accumulated a sum of 2085 (25.045%) citations during the time span 1991–2021. The table shows that the most cited publication was *The geography of ethnic violence: Identity, interests, and the indivisibility of territory* (2010) by M.D. Toft, which was cited 427 times. This was followed by "Trauma and PTSD symptoms in Rwanda: Implications for attitudes toward justice and reconciliation" (2004) by Pham et al. with 254 citations (Table 10).

Major findings

1. This study identified the three major development stages of nonviolence research during three decades (1991–2021). The annual research productivity in nonviolence research has grown at a slow pace in stage 1 (1991–2000), grown at a moderate pace in stage 2 (2001–2010), and grown at a fast pace in stage 3 (2011–2021).
2. The authorship patterns in nonviolence research show a single authorship trend as most of the publications have been published by single authors. In all, a total of 71.57% of the literature was published as single-author works, whereas 28.43% of publications had multiple authors.
3. The calculated values of CI, CC, and MCC demonstrate the positive trend but indicate the fluctuation in collaborative pattern as time proceeds.
4. The researchers preferred to publish their work in the form of the journal articles accounting for 61.22% (1124) of the total publications, followed by book chapters (17.32%) and reviews (9.91%).
5. The distribution of research productivity demonstrates the two major subject categories for publication; Social Sciences (62.15%) and Arts & Humanities (42.54%).
6. The retrieved publications data revealed that out of the total research output, a total of 16.67% (306) publications were the funded projects.
7. The global research productivity in nonviolence registered an overall annual AGR of 20.17% and a CAGR of 9.75%.
8. The highest number of author's productivity was found in the year 2018 (283). The mean AAPP and PPA were 1.48 and 0.69, respectively.
9. The RGR for the global research productivity in nonviolence decreased constantly from the rate of 0.55 to 0.08. On the contrary, DT of research productivity displays an increasing trend from the rate of 1.26 to 8.67.
10. Based on total number of publications published and total number of citations received, the United States comes up as the top productive country with the highest 39.98% publications

and highest 54.70% citations of the total. Overall, the prolific and leading contributors are authors, organizations, and publishing outlets in the USA.

11. Based on the keyword frequency and their co-occurrence relationships, three major topical theme clusters emerged; first theme cluster relates to religion and spirituality, second theme cluster relates to nonviolence, peace, and conflict and the third theme cluster relates to political tactics, law, and social movements.

12. Reflecting the key content on nonviolence, the most frequent keywords included nonviolence (frequency = 270), nonviolence (frequency = 169), violence (frequency = 147), and peace (frequency = 63).

CONCLUSION

Bibliometric analysis of publications in the field of peace studies is not a widespread practice, yet the findings from the analysis of just one topic area, nonviolence, illuminate publication trends that can govern decisions about the focus for new studies, the publications that give peace studies the most visibility, and the factors that lead to more or less research productivity in the area of peace studies. The data raise questions about the factors that promote and inhibit the publication of research in different disciplines, nations, and outlets. Bibliometric research holds great potential for further investigation into research and publication practices that can strengthen the presence of peace studies within humanities and social science fields more broadly. In addition, bibliometric data can aid funding agencies in allocating grants and other resources in existing areas of strength, or to support areas that the data show to be under-resourced. It suggests that the literature available in other databases such as Web of Science (WoS), PubMed, Dimensions, and Google Scholar may be harvested in future research by bringing more quantitatively measured insights using current advancements in data analysis. In the end, this work has revealed current research trends in nonviolence and provided a model for conducting bibliometric analysis on all areas of peace research, which is an unquestionably vital area of knowledge creation in need of greater visibility both in and outside of academia.

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