



BIBLIOMETRIC ANALYSIS OF ATTITUDE TOWARDS OCCUPATIONAL HAZARDS AND SAFETY IN HEALTHCARE SYSTEM

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Abstract:

Occupational hazard is a major concern in any industry. Like any other industry healthcare organisation has various types of health hazards like physical, chemical, biological and ergonomic hazards. This study focuses on the attitude alongwith occupational hazards and safety in healthcare. This is a bibliometric study which includes the data from Scopus database using suitable keywords. The study includes the data ranging from 2000 to 2022. The Scopus and VOS Viewer was used to map the frequency of publications, year, keywords and cluster of authors. Total 4014 articles were selected for study out of which higher frequency was from medicine and nursing subjects. Unites States and United Kingdom has the highest number of publications and documents regarding Occupational hazards and safety. This study put emphasis on certain Criteria which help in future reference for policy makers and stakeholders regarding occupational Hazards and safety.

Keywords: Occupational Health, Occupational Hazards, Safety, Healthcare, Attitude

1. INTRODUCTION:

Worldwide, healthcare institutions are considered to have significant levels of occupational accidents and occupational risks. Historically, healthcare workers have been exposed to numerous different occupational risks, and this risk exposure remains high today [1-2].

Health care facilities (HCFs) are institutions that provide health care services, including counselling, clinical, surgical, and/or psychiatric consultations and treatment services for the healthy, sick and the injured [3]. Globally, HCFs employ over 59 million workers and offer variety of services to clients and patients, and are classified as hazardous and high risk work place [4, 5]. Healthcare facilities like other high risk work places are characterized by a high level of exposure to hazardous agents that have the potential to cause/increase the risk of injury or ill health [6-8].

Occupational safety is the control of hazards in the work place to achieve an acceptable level of risk, while workplace safety generally refers to the process of protecting the health and safety of staff while on the job, irrespective of vocation [8, 9].

HCWs may encounter many risks of danger, accidents and diseases due to several reasons such as infections, blood/blood fluid infected material, medicines, dangers from the materials, water products, over workload and sharp objects injuries [10- 12].

Occupational hazards are divided into five groups according to their nature: 1) physical risks, related to exposure to noise, ionizing radiation, and temperature; 2) chemical risks, related to exposure to gases, vapors, fumes, and chemicals; 3) biological risks that include exposure to viruses, bacteria, blood and blood products; 4) ergonomic risks, relate to the requirement of improper posture, monotony, repetitiveness, work shifts, and situations causing stress; and 4) risks of accident that include arrangement of inappropriate work environment, insufficient lighting, potential accidents with electricity and fire [13].

Various Factors like negligence and carelessness of health care workers, lack of adequate protective aids, inadequate number of staff, excessive workload, failure to observe basic safety and hygiene guidelines, and inadequate operational knowledge of modern healthcare equipment [14]. These prompted the CDC to develop standard precautions (SPs) for preventing occupational exposures and handling of infectious materials in HCFs [15, 16]. Adherence to the SP guidelines has been shown to be effective in curtailing occupational illnesses and injuries among HCWs in HCFs [17]. This study highlights the major area of research on the basis of different parameters. This study includes various determinants to be included and based on the available data the bibliometric study is carried out.

2. Research Approach

The previous work done by the researcher play an important role in any research. This study also imparts future implications of the occupational hazards and safety in healthcare with the help of Bibliometric analysis.

Bibliometric analysis or a study always provides important information regarding the scientific data in a particular country as well as international context. This study includes the international context during analysis.

2.1. Database Selection and Data Collection

WOS and Scopus are two valuable and well accepted data base. Web of Science (WOS) is administered by Clarivate Analytics and Scopus is administered by Elsevier.

This bibliometric study is done by using Scopus Database with the help of keywords like “Occupational Hazards” or “Safety” and “Attitude” and “Healthcare” or “Health Workers”.

The study includes the data ranging from 2000 to 2022 and the documents were limited to above mentioned keywords. Total of 4014 documents were searched including data related to occupational hazards and safety along with Attitude of healthcare workers towards it.

2.2. Statistical Analysis

This research focused on descriptive analysis which includes subject wise documents, documents by affiliation, documents by country, documents by sponsors, language, document type, leading authors and organisation wise documents.

The data ranging from 2000 to 2022 and the data analysis was done with the help of VOS Viewer and Scopus Analyze tool. The analysis done with the help of VOS Viewer includes the analysis on the basis of Co- authorship between authors, countries, Co-occurrence of all keywords, Citation includes author, organisation, source and country.

2.4. Exclusion and Inclusion Criteria

The inclusion criteria in this study includes on the words like “occupational hazards”, “safety”, “attitude”, “healthcare” and “health workers”. These terms were based on the objective of this study, as the purpose was to analyse the attitude of healthcare workers or health workers towards occupational hazards and safety. The Boolean operators used like “AND” and “OR” to link all the terms.

The exclusion criteria used were the period of time, the subject of study, language and document type. Additionally, the type of document was determined in order to exclude non-scientific productions, such as obituaries.

2.5. Research Strategy

A total of 5498 paper were searched before applying desired filters using the keywords like "Occupational hazards" OR "Safety" AND "attitude" AND "healthcare" OR "health Workers" in search documents using search within article title Abstract, Keywords.

Analyze search results were : TITLE-ABS-KEY ("occupational hazards" OR "Safety" AND "attitude" AND "healthcare" OR "health Workers") AND PUBYEAR > 1999 AND PUBYEAR < 2023 AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "k") OR LIMIT-TO (SRCTYPE , "d")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "NURS") OR LIMIT-TO (SUBJAREA , "PHAR") OR LIMIT-TO (SUBJAREA , "IMMU") OR LIMIT-TO (SUBJAREA , "BIOC") OR LIMIT-TO (SUBJAREA , "HEAL") OR LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "VETE") OR LIMIT-TO (SUBJAREA , "PSYC") OR LIMIT-TO (SUBJAREA , "AGRI") OR LIMIT-TO (SUBJAREA , "NEUR") OR LIMIT-TO (SUBJAREA , "DENT"))

Then After applying suitable filters the document reduced to 4014. The desired filters are following: Year (2000-2022), Subject area (Medicine, Nursing, Pharmacology, Toxicology and Pharmaceutics, Immunology and Microbiology, Biochemistry, Genetics and Molecular Biology, Health Professions, Environmental Science, Veterinary, Psychology, Agricultural and Biological Sciences, Neuroscience, Dentistry), Document type (Original Articles and conference),

Language (English), Keyword (All the searched items), Country/ territory (All the searched items), Source type (Journal, Conference proceeding, Book series. Trade journal), Source title (All the searched items), Author name (All the searched items), Publication stage (Final Stage), Affiliation (All the searched items), Funding sponsor (All the searched items), Open access (All the searched items)

After searching 4014 items, the data was exported to Excel in .csv format and with the help of VOS Viewer and Scopus Analyze tool data analysis was done and finally, the cluster determination of the thematic collections was examined with VOS viewer, resulting in diverse maps of global connections between authors and countries, as well as research tendencies, using keywords.

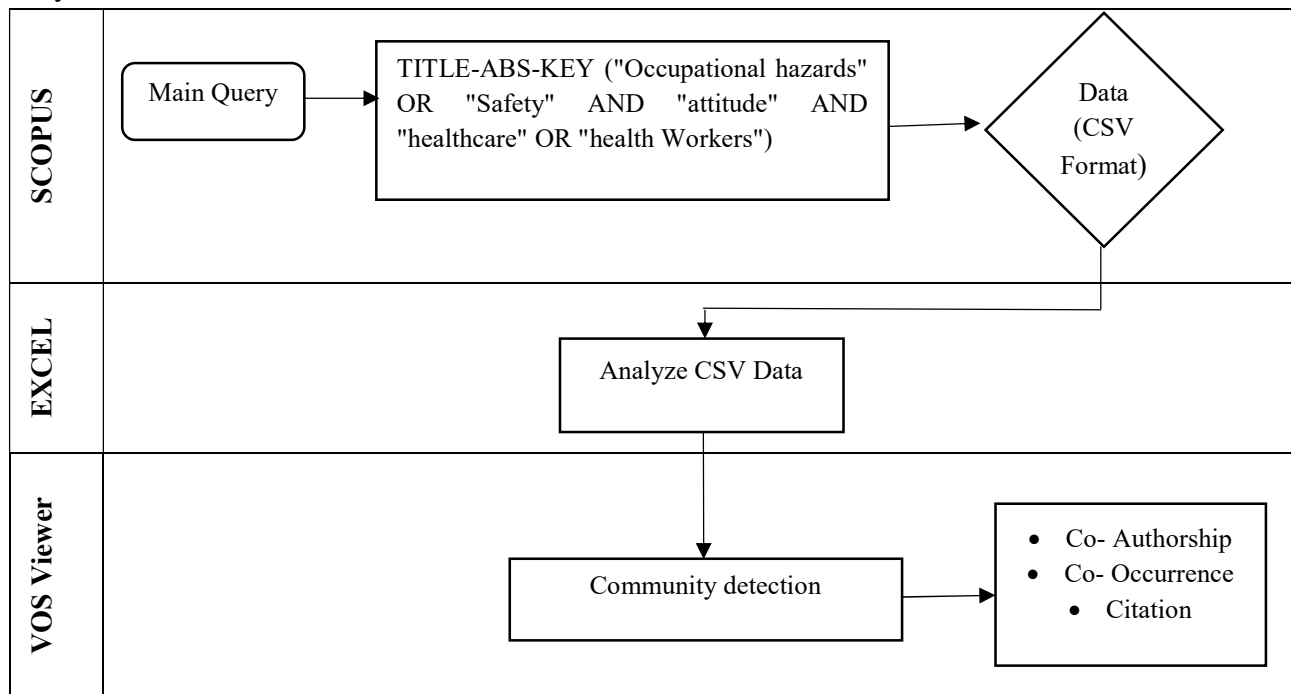


Figure 1: Methodology Structure

3. Results and Discussion

The data analysis was done with the help of Scopus Data Analysis tool where sections like Documents by year, Subject area, authors, affiliation, sponsor, country/ territory, source, document type were covered under analysis part. Then data was analysis done with the help of VOS Viewer which covered sections like Co-authorship, Co-occurrence, Citation.

A. Scopus Data Analysis

1. Documents by Year

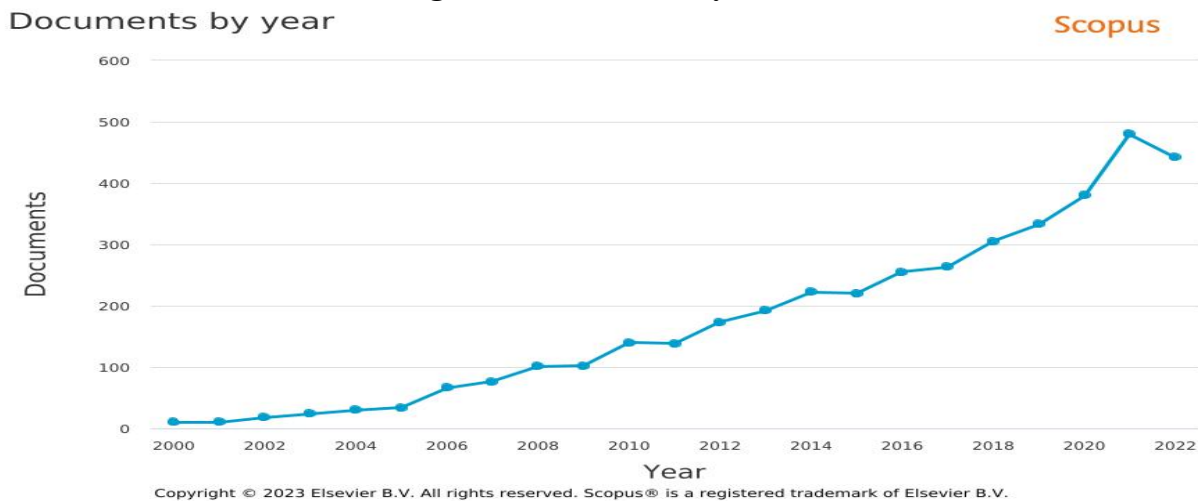
The selected documents ranging from 2000-2022 were included in research. Out of which last ten years data is shown in table 1. In the year 2021 highest number of documents were published which was about 480 out of 4014 documents. In figure 2 the trend of distribution of document by year wise is shown. It is also clearly visible that documents related to occupational hazards,

safety and attitude have increased till time, except that in 2022 a mild decline in number of document published.

Table 1: Documents by Year

Year	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Documents	442	480	380	333	305	263	255	220	222	192

Figure 2: Documents by Year



2. Documents by Subject area

Documents from top ten subjects is shown in Table 2 where it is clear that Medicine has highest no. of published documents which is around 3250 documents whereas Agricultural and Biological Sciences have the minimum document i.e. 52 in top ten subjects.. Figure 3 shows distribution of subject wise documents in the form of a Pie Chart. Also the

Table 2: Subject wise Documents

S. No.	Subject Area	Documents
1	Medicine	3250
2	Nursing	737
3	Pharmacology, Toxicology and Pharmaceutics	375
4	Biochemistry, Genetics and Molecular Biology	259
5	Immunology and Microbiology	258
6	Health Professions	215
7	Environmental Science	181
8	Veterinary	102
9	Psychology	63
10	Agricultural and Biological Sciences	52

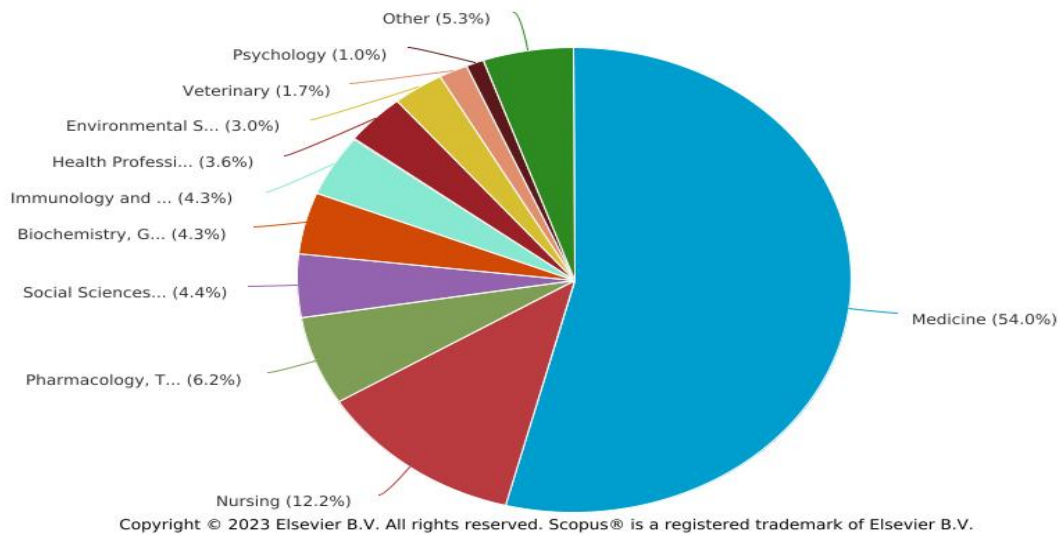


Figure 3: Documents by Subject Area

3. Documents by Affiliation

Table 3 shows documents by Affiliation of top ten universities across the world among which the University of Toronto has the highest no. of documents which is around 66 and The University of British Columbia has 36 documents published related to Occupational hazards, safety and Attitude of health workers. The Figure 4 shows the graphical presentation of top ten universities with the distribution of documents.

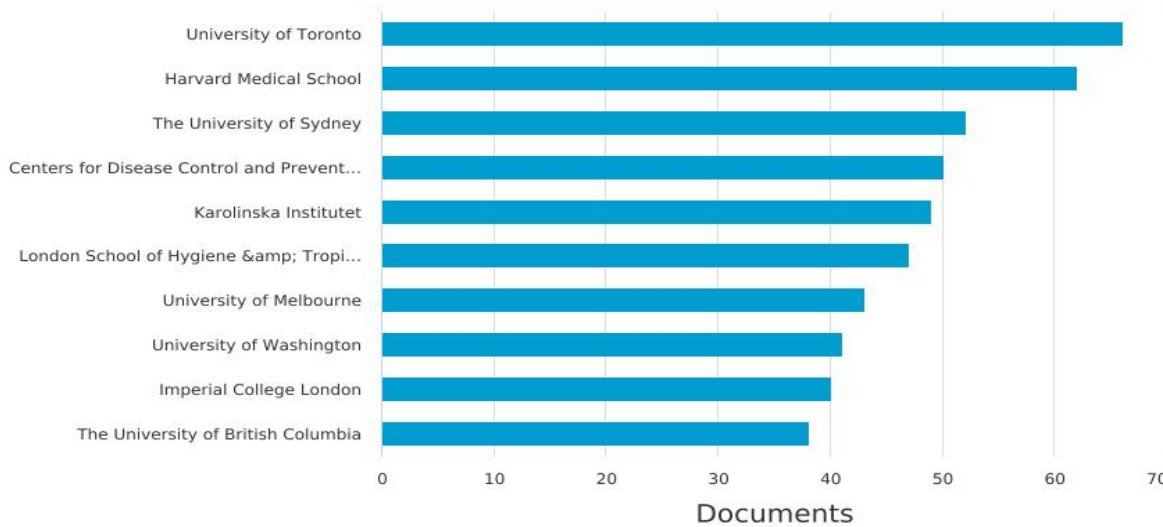
Table 3: Documents by Affiliation

S. No.	Affiliation	Documents
1	University of Toronto	66
2	Harvard Medical School	62
3	The University of Sydney	52
4	Centers for Disease Control and Prevention	50
5	KarolinskaInstitutet	49
6	London School of Hygiene & Tropical Medicine	47
7	University of Melbourne	43
8	University of Washington	41
9	Imperial College London	40
10	The University of British Columbia	38

Documents by affiliation

Scopus

Compare the document counts for up to 15 affiliations.



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Figure 4: Documents by Affiliation

4. Documents by Author

Distribution of documents by author is shown in table 4 with showing top ten authors with highest published documents from year 2000-2022. From the table 1 it is analysed that Braithwaite, J. has 20 documents which is higher among top 10 authors and Awaisu, A. has published 6 documents in given period. Figure 5 shows graphical presentation of authors with highest documents.

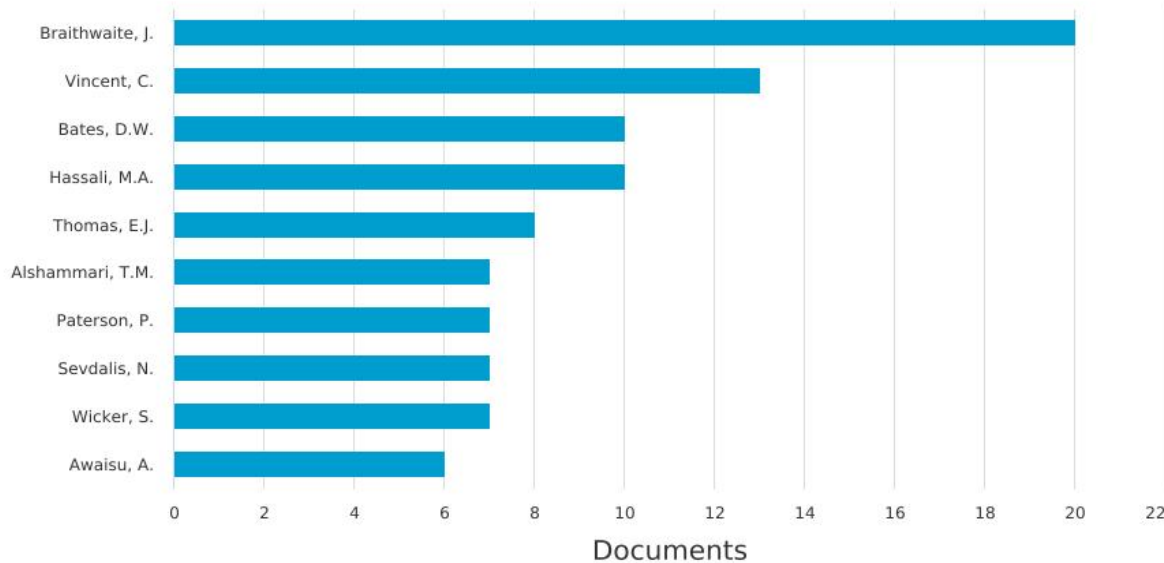
Table 4: Documents by Author

S. No.	Author Name	Documents
1	Braithwaite, J.	20
2	Vincent, C.	13
3	Bates, D.W.	10
4	Hassali, M.A.	10
5	Thomas, E.J.	8
6	Alshammari, T.M.	7
7	Paterson, P.	7
8	Sevdalis, N.	7
9	Wicker, S.	7
10	Awaisu, A.	6

Documents by author

Scopus

Compare the document counts for up to 15 authors.



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Figure 5: Documents by Author

5. Documents by Country

Table 4 shows the top ten country/ territory with the highest documents, among which United States has the highest no. of documents of 1272 and China has around 115 published documents regarding Inclusion criteria of our research. Although United Kingdom has 606 documents published but it is almost half of the total documents published in United States. Figure 6 shows graphical presentation of top ten Country/ Territory with distribution of documents.

Table 5: Documents by Country

S. No.	Country/Territory	Documents
1	United States	1272
2	United Kingdom	606
3	Australia	316
4	Canada	243
5	Netherlands	136
6	Italy	132
7	Sweden	131
8	Saudi Arabia	118
9	India	116
10	China	115

Documents by country or territory

Scopus

Compare the document counts for up to 15 countries/territories.

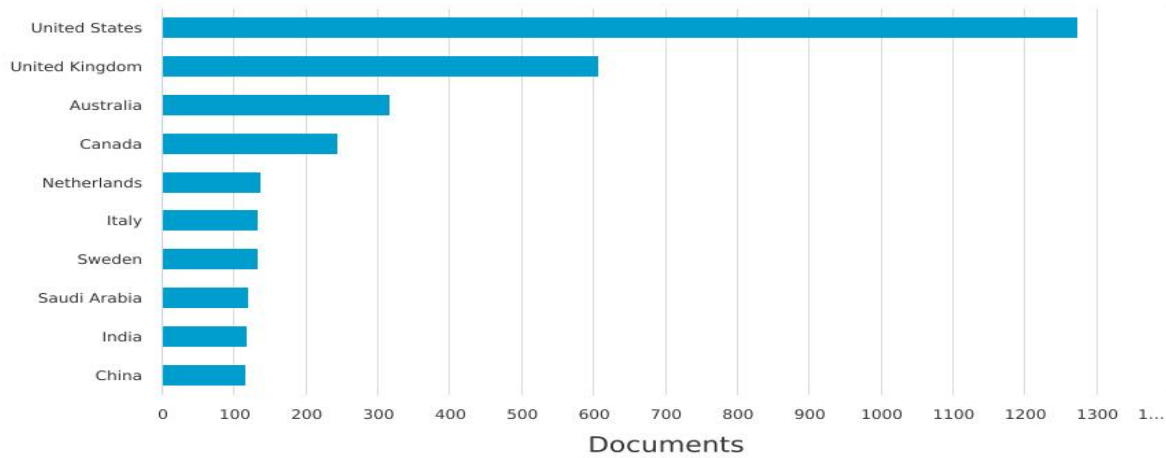


Figure 6: Documents by Country/ Territory

6. Documents by Document type

The table 6 shows that two type of documents were available on Scopus database which are 3961 Article and 53 Conference paper and the same has been displayed in Figure 7 also.

Table 6: Documents by Document Type

S. No.	Document Type	Document
1	Article	3961
2	Conference Paper	53

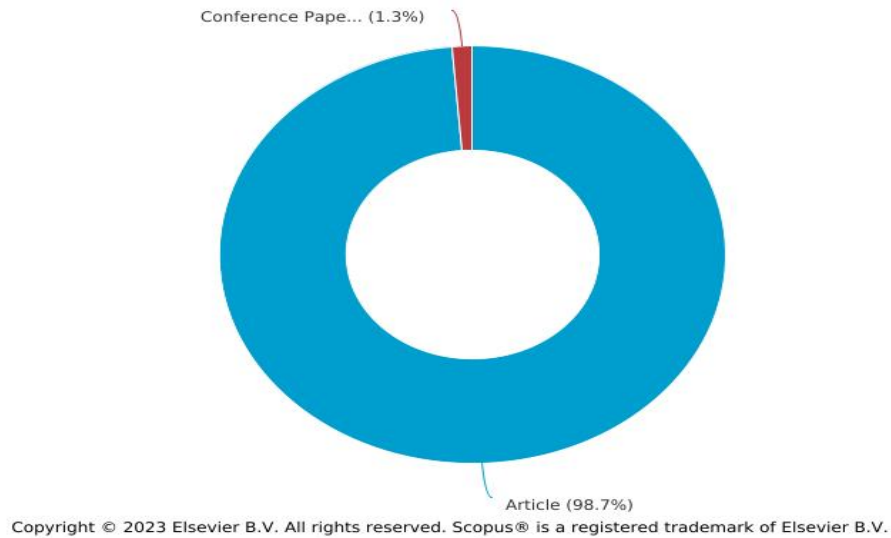


Figure 7: Documents by Document Type

7. Documents by Funding Sponsor

Table 7 shows the top ten sponsors across the world which meets the inclusion criteria among which National Institute of Health has sponsored with highest no. of documents i. e around 136 and Canadian Institutes of Health Research has sponsored with 25 documents. Figure 8 shows graphical presentation of Funding sponsor with distribution of documents.

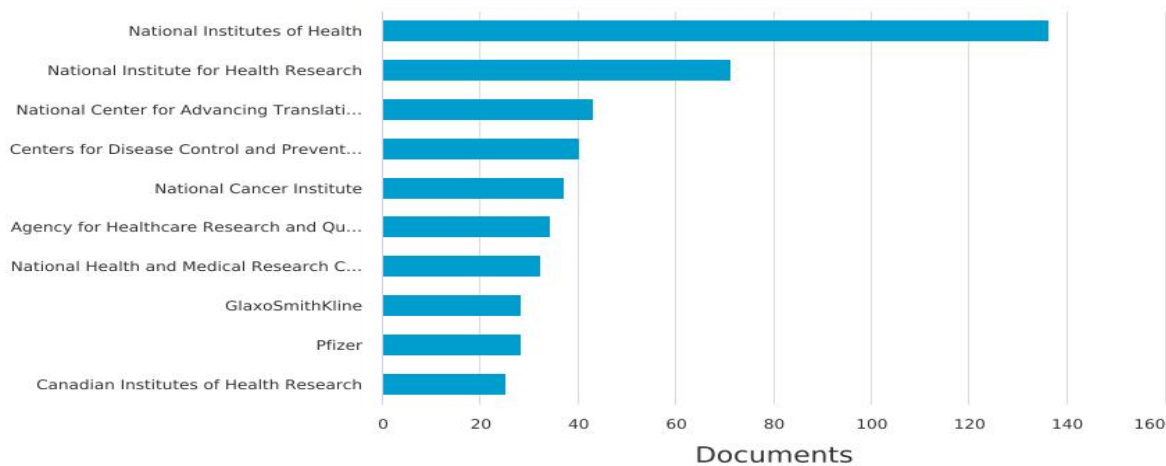
Table 7: Documents by Funding Sponsor

S. No.	Funding Sponsors	Documents
1	National Institutes of Health	136
2	National Institute for Health Research	71
3	National Center for Advancing Translational Sciences	43
4	Centers for Disease Control and Prevention	40
5	National Cancer Institute	37
6	Agency for Healthcare Research and Quality	34
7	National Health and Medical Research Council	32
8	GlaxoSmithKline	28
9	Pfizer	28
10	Canadian Institutes of Health Research	25

Documents by funding sponsor

Scopus

Compare the document counts for up to 15 funding sponsors.



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Figure 8: Documents by Funding Sponsor

8. Documents by Source

Table 8 shows documents of top ten source with the highest number of documents of International Journal of Environmental Research and Public Health i.e.145 documents and BMJ Open has also published documents of around 133 and Human Vaccines And Immunotherapeutics has 38 number of documents. Figure 9 shows the distribution of Documents by Source.

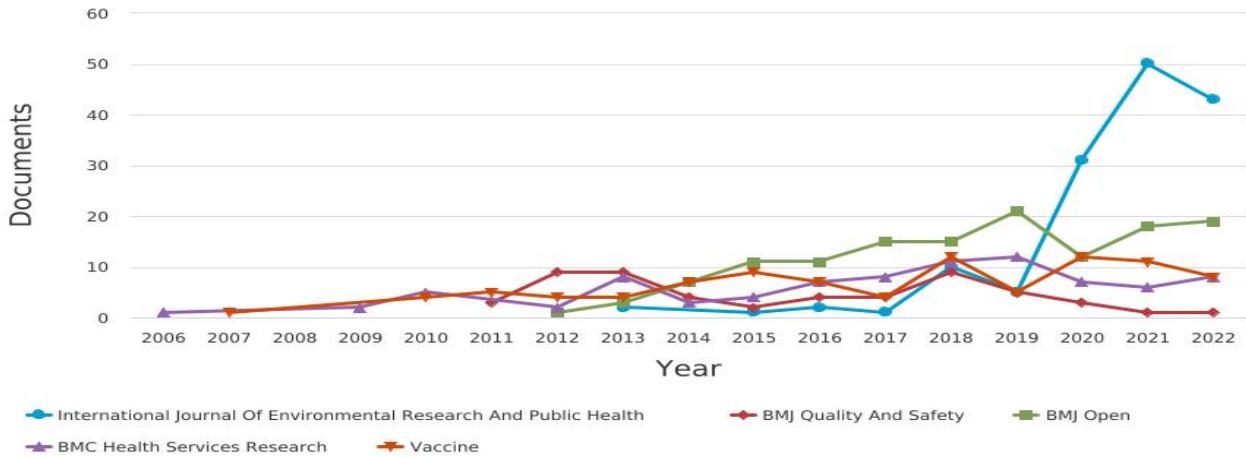
Table 8: Documents by Source Title

S. No.	Source Title	Documents
1	International Journal Of Environmental Research And Public Health	145
2	BMJ Open	133
3	Vaccine	93
4	BMC Health Services Research	84
5	BMJ Quality And Safety	54
6	Journal Of Clinical Nursing	54
7	Vaccines	47
8	Infection Control And Hospital Epidemiology	38
9	International Journal For Quality In Health Care	36
10	Human Vaccines And Immunotherapeutics	34

Documents per year by source

Scopus

Compare the document counts for up to 10 sources. Compare sources and view CiteScore, SJR, and SNIP data



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Figure 9: Documents by Source

B. VOS Viewer Data

1. Co- Authorship Network

With the help of VOS Viewer Software Network analysis of Co- Authorship with Authors and Country as a unit of analysis which are shown in Figure 10 and 11.

i. Authors Network Visualisation

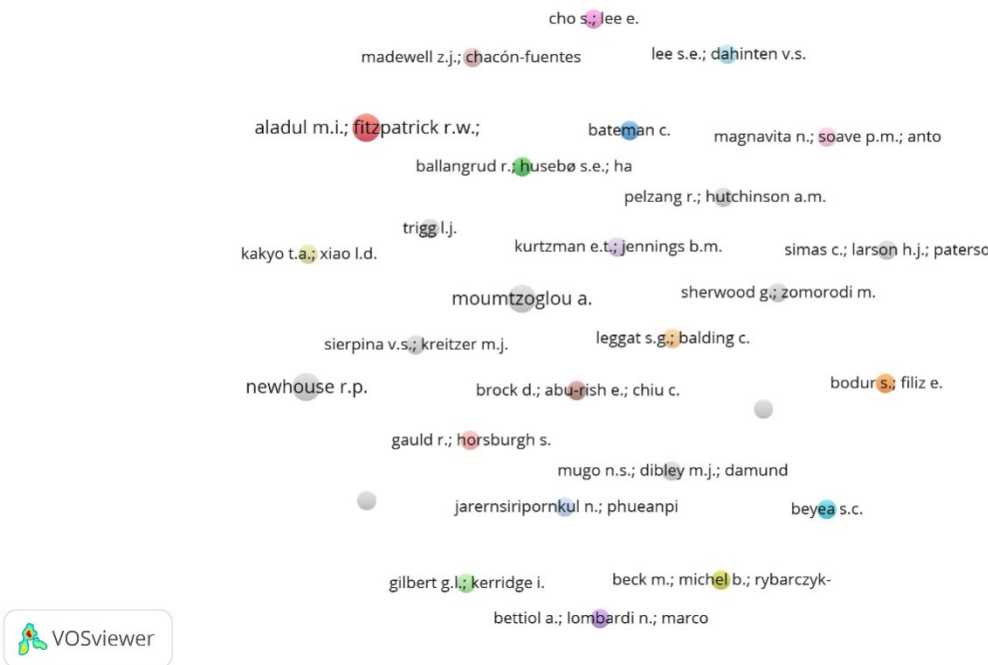


Figure 10: Network Visualisation of Co- Authorship with Author as a Unit of Analysis

When VOS Viewer was used for analysis of data, first Co-authorship was checked showing collaboration of authors among them. During analysis minimum 2 document of an author and minimum 1 citations was taken into consideration for further analysis. Out of 3978 authors, 28 meet the threshold. After analysis it was found that total 28 clusters formed and cluster of aladulm.i.; fitzpatrickr.w.; chapman s.r. was having highest no. of documents i.e 3 and citations as 66 whereas cluster of salmon d.a.; dudleym.z.; glanzj.m.; omers.b. shows that they have worked alongwith 2 documents and highest number i.e. 403 no. of citations among all the clusters.

ii. Country

In the Co- authorship analysis the second unit after authors was Country. And using country as unit network analysis was done which is shown in Figure 11.

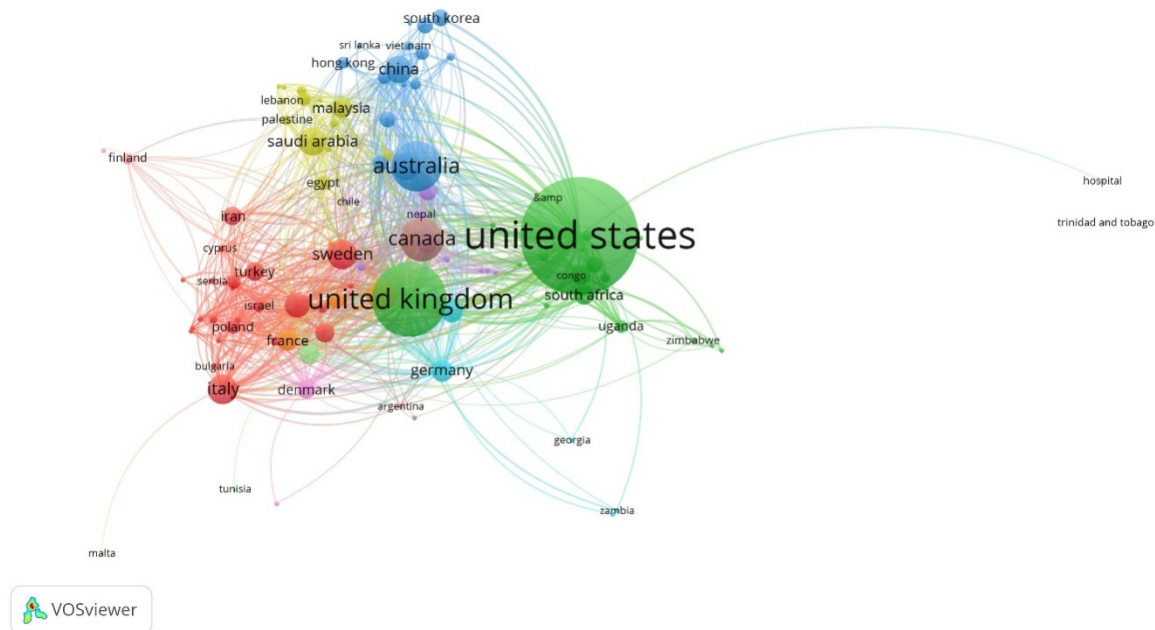


Figure 11: Network Visualisation of Co- Authorship with Author as a Unit of Analysis

While doing analysis of countries under Co- Authorship the minimum documents of a country were taken as 3 and minimum citations of a country was also taken as 3 then analysis was done. Out of 231 countries only 106 meet the thresholds. Total of 14 clusters formed out of which cluster 1 contains 24 items and cluster 2 contains 20 items. Out of these clusters United States has highest number of Documents and Citations. Cluster 1 has highest number of countries for collaborations.

2. Co- Occurrence of All Keywords

Figure 12 shows co- occurrence of all keywords with minimum 5 keywords in a documents.

During the period from 2000- 2022, out of 15735 keywords only 2948 meets the thresholds.

Table 9 shows most commonly occurring keywords. Relevant keywords help in research process and inclusion criteria also depend upon the searched keywords.

Few among most commonly occurring keywords are human, humans, article, female, adult, male, health, personnel attitude, questionnaire, health care personnel, attitude of health personnel etc.

Table 9: Most Commonly Occurring Keywords

S. No.	Keyword	Occurrences	Total link strength
1	Human	3782	113577
2	Humans	3225	100411
3	Article	3069	97093
4	Female	2422	79177
5	Adult	2202	72276
6	Male	2152	70462
7	health personnel attitude	1410	43974
8	questionnaire	1308	41455
9	health care personnel	1210	39469
10	attitude of health personnel	1249	38619
11	middle aged	1089	37593
12	attitude to health	1137	37255
13	patient safety	1268	37144
14	cross-sectional study	953	30692
15	health knowledge, attitudes, practice	894	29858
16	controlled study	827	28887
17	drug safety	832	28231
18	major clinical study	719	25868
19	cross-sectional studies	758	25505
20	Psychology	749	25372

ii. Authors

Figure 14 shows Citation network analysis of authors which was done using minimum no. of 2 documents of an author and minimum no. of 1 citations of author. Out of 3978 authors, 28 meet the thresholds. Total of 28 clusters formed in which each clusters has 1 item.



Figure 14: Citation Network of Author

The cluster no. 1 having authors aladulm.i.; fitzpatrickr.w.; chapman s.r. has highest documents i.e. 3 with 66 citations. The authors of cluster no. 23 are Salmon d.a.; dudleym.z.; glanzj.m.; omers.b. having 2 documents and 403 highest citations among all the authors.

iii. Organisation

Figure 15 shows that Citation network of Organisation which was searched with minimum no. of 5 documents of an organization and minimum no. of 3 citations. Out of 13645 organisation, 12 meet the thresholds. As shown in Figure 15, Harvard Medical School, Boston has 479 citation and 15 documents which is highest among all the cluster of citation. Department of Health studies Norway is on second number with 5 documents and 234 citations.



Figure 15: Citation Network of Organisation

iv. Country

Figure 16 show the Citation Network of country which was searched with minimum no. of 10 documents of a country and minimum no. of 5 citation of a country. Out of 231 countries 62 meets the thresholds. Analysis shows that United States has 1280 documents and 31368 citations which is highest among all the countries and United Kingdom has the second highest number i.e. 606 documents and 16217 citations.

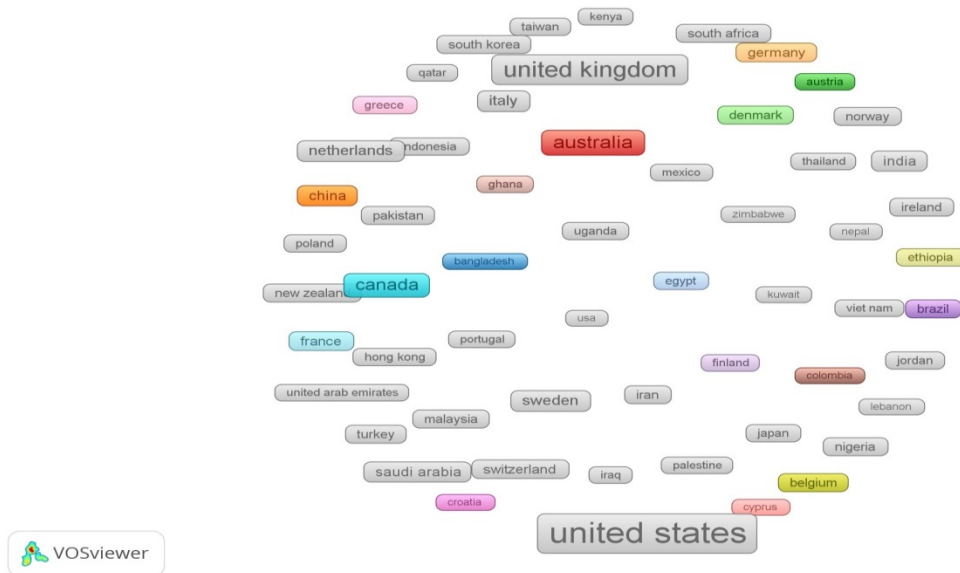


Figure 16: Citation Network of Country

4. Conclusion:

This paper examines the trends in research focused on Occupational Hazards, safety and attitude of healthcare workers towards it. Healthcare workers may be any staff of healthcare facility. This study shows that trajectory of research in this field has been increased with time the publication regarding occupational hazards and safety has increased over time.

Occupational hazards and safety ensures the safe workplace for staff of an organisation. This study shows how different countries involve in Occupational Safety like activities by highlighting their concern and preventive measures with the help of publication or other medium. This study also highlights that attitude of healthcare workers decided whether they cooperate the occupational safety protocols or not. It is shown in the study that United states has highest documents and citations about occupational hazards and safety. The standard guidelines are also implemented in United States which improves the workplace safety measures.

This study highlights that the subject area of highest publication where most of the publication are from medicine and allied health fields like nursing. This study also highlights the affiliations and particular journal for future research.

There are main area of research also show collaborations between authors and countries. Citations of the authors and country are highlighted for future reference for research.

Like any other study this study has also some limitations because some keywords might not be the same in some study. As this study also used selected keywords for research, some keywords are missing which might help in research.

Implications of this study is that this study highlights the area of higher priority like affiliation, source, citations, country etc. which will help in further research in occupational hazards and safety. This study put emphasis on the countries and journals which are important for any researcher to fulfil for better research.

The bibliometric visualizations also provide an accessible means of communicating the key findings to researchers, policymakers, and those working in public health.

5. Reference

1. Kunaviktikul, W., et al. (2015) Nurses' extended work hours: patient, nurse, and organizational outcomes. *International Nursing Review*, 62, 386–393
2. Ndejjo, R., et al. (2015) Occupational health hazards among healthcare workers in Kampala, Uganda. *Journal of Environmental and Public Health*, 2015, 913741, 9 pages.
3. Editors of the American Heritage Dictionaries. The American Heritage Student Science Dictionary, *New upd ed. Houghton Mifflin Harcourt*; 2009. p. 384. ISBN-10: 0547002432.
4. Pruss A, Giroult S, Rushbook P. Safe management of waste from healthcare activities. Geneva: *World Health Organization*; 1999.
5. Stonerock T. Women and the labour market. In: Rutledge S, Maslach WC, Marek T, editors. Professional burnout. Recent developments in theory and research. London, New York. 2004.
6. Occupational Health and Safety Policy and Guidelines for the Health Sector, Ministry of Health/Ghana Health Service, Ghana. 2010. p. 68. [http:// www.moh-](http://www.moh-)

ghana.org/UploadFiles/Publications/OHS%20Policy%20&%20

Giudelines%20for%20Health%20Sector140204090745.pdf. Accessed 15 June 2015.

7. Ford MT, Tetrick LE. Relations among occupational hazards, attitudes, and safety performance. *J Occup Health Psychol.* 2011;16(1):48–66.
8. Tziaferi SG, Sourtzi P, Kalokairinou A, Sgourou E, Koumoulas E, Velonakis E. Risk assessment of physical hazards in Greek hospitals combining staff's perception, experts' evaluation and objective measurements. *Saf Health Work J.* 2011;2(3):260–72. doi:10.5491/SHAW.2011.2.3.260.
9. Oluwagbemi B. Themes and issues in occupational health and safety. 2nd ed. Bangalore: *Vertex Media Limited*; 2011.
10. Tarantola, A., Abiteboul, D., & Rachline, A. (2006). Infection risks following accidental exposure to blood or body fluids in health care workers: a review of pathogens transmitted in published cases. *American journal of infection control*, 34(6), 367-375.
11. Kuruuzum, Z., Yapar, N., Avkan-Oguz, V., Aslan H, Ozbek, O.A., Cakir, N., & Yuce, A. (2008). Risk of infection in health care workers following occupational exposure to a non-infectious or unknown source. *Am J Infect Control*, 36(10), e27-E31.
12. Bahcecik, N., & Ozturk, H. (2009). The occupational safety and health in hospitals from the point of nurses. *Collegium antropologicum*, 33(4), 1205-1214.
13. Volquind, D., Bagatini, A., Monteiro, G. M. C., Londero, J. R., & Benvenuti, G. D. (2013). Occupational hazards and diseases related to the practice of anesthesiology. *Brazilian Journal of Anesthesiology (English Edition)*, 63(2), 227-232.
14. Amosun AM, Degun AM, Atulomah NOS, Olanrewaju MF, Aderibigbe KA. Level of knowledge regarding occupational hazards among nurses in Abeokuta, Ogun state, Nigeria. *Curr Res J Biol Sci.* 2011;3(6):586–90.
15. Molinari JA. Infection control: it's evolution to the current standard precautions. *J Am Dent Assoc.* 2003;134(5):569–74.
16. Centers for Disease Control. Mycobacterium tuberculosis transmission in a health clinic—Florida, 1988. *MMWR.* 1989;38:263–4.
17. Ayalu A, Reda SB, Amae D, Alemayehu A, Belachew T, Tiyou A, Deribe K. Knowledge and attitudes of caregivers of HIV-infected children towards antiretroviral treatment in Ethiopia. *Patient Educ Couns.* 2011;85(2):89–94.