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Bibliometric Analysis of Global Trends and Collaboration Patterns in Physiotherapy Research: A Dimension Database Perspective

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Abstract:

The purpose of the study is to explore the Dimension Database and review the scientific contribution to the research on Physiotherapy published in UGC Care list Group – II type of journals from 2013 to 2022. The data were extracted according to predefined checklist, collected data were analysed using VOS Viewer Software. In this study the data of total 23887 articles, 12167 authors, 97 countries and 4040 organizations were analysed. It is found that Catherine Sherrington is the most noticeable author in Co-authorship analysis for their research contribution of 6 articles, 32 citations and 50 total link strength; George



Natoumenopoulos is most noticeable author in citation analysis for their research contribution of 9 articles, 154 citations, and 225 total link strength; the most noticeable country is United Kingdom in country wise bibliographic coupling for their research contribution with 420 articles and 2027 citations. While most noticeable organization is University of Queensland in organization wise bibliographic coupling for their research contribution with 420 articles and 2027 citations.

Keywords: Bibliographic Coupling, Bibliometric Analysis, Citation Analysis, Co-authorship Analysis, Dimension, Physiotherapy.

1. INTRODUCTION:

Physical therapy (PT), also known as physiotherapy, is one of the allied health professions.¹ Physical therapists give it by promoting, maintaining, or restoring health through physical examination, diagnosis, management, prognosis, patient education, physical intervention, rehabilitation, illness prevention, and health promotion. In many countries, physical therapists are referred to as physiotherapists.

Musculoskeletal, orthopaedics, cardiovascular, neurology, endocrinology, sports medicine, geriatrics, paediatrics, women's health, wound care, and electromyography are some of the disciplines available in Physiotherapy. Physical therapists work in a variety of settings, both public and private.²

In addition to clinical practice, other aspects of physical therapist practice include research, education, consultation, and health administration. Physical therapy is provided as a primary care treatment or alongside, or in conjunction with, other medical services. In this domain huge amount of research has been carried out till date. The purpose this paper is to explore bibliometric analysis of research paper published in Physiotherapy.

2. REVIEW OF LITERATURE:

Ejaz, Hasan (et. al) (2022) carried out bibliometric analysis of publications on the Omicron Variant from 2022 to 2022. The data were collected from Scopus Database and statistical analysis of the publications were performed using Microsoft Excel 365, VOS Viewer Software, Bibliometrix, Biblioshiny, and R software packages. They found that viruses was



the most popular in publications for Omicron variant research, with 150 papers published, while Cell was the most cited source. They also found that the USA is the most productive nation with highest number 344 publications and highest level of international collaboration. While Viruses is the journal which is found with highest preferences of publication on Omicron. As a top keywords SARS-CoV-2 used 978 times while Omicron were used 408 times respectively. They concluded that the Biblioshiny application from R's Bibliometrix package and VOSviewer provided significant study streams and topics.³

Soesanto, Hari (et. al) discussed on bibliometric analysis and literature review on current trends, future direction and enablers of e-waste management. The data were extracted from Scopus database, 441 peer-reviewed papers from 2012 to 2021 were collected for bibliometric analysis. The research used multiple keywords to search the data i.e. circular economy, developing countries, e-waste, recycling, e-waste management, human health, policy, strategies, and sustainability. The collected data were analysed in biblioshiny and VOS viewer software packages. They found that the number of e-waste management articles are substantial and has the potential to grow as e-waste management becomes more prevalent.⁴

3. SUBJECT INTRODUCTION: DIMENSION DATABASE:

Dimensions is a database of abstracts and citations and of research grants, which links grants to resulting publications, clinical trials and patents. Dimensions is part of Digital Science (or Digital Science & Research Solutions Ltd) - a technology company headquartered London, United Kingdom. The company focuses on strategic investments into startup companies, that support the research lifecycle. **Dimensions** was launched in 2018. It is accessible free-of-charge at app.dimensions.ai.⁵

Two studies published in 2021 compared Dimensions with its subscription-based commercial competitors, and both concluded that Dimensions.ai provided broader temporal and publication source coverage than Scopus and Web of Science in most subject areas, and that Dimensions was closer in its coverage to free aggregation databases, such as The Lens and Google Scholar. As of July 2023, Dimensions.ai covers nearly 140 million publications with over 1.8 billion citations.⁶



4. SCOPE AND LIMITATION OF THE STUDY:

The scope of the study is 1) research on Physiotherapy, 2) document type is only the research articles, 3) publishing criteria is UGC Care list Group – II journals, 4) year span is 2013 to 2022 (10 years), 5) all the data for the study extracted from Dimension database, so one major criterion is articles published in Dimension database. In this research, the limitation includes the fact that only the Dimension database was searched for relevant data. Therefore, the limitation of the study is Dimension database.

5. RESEARCH METHODOLOGY:

The approach for performing the research is structured in five steps: (1) data search strategy, (2) data gathering, (3) data screening and data filtering, (4) quantitative analysis, and (5) interpretation. Bibliometric research is a set of measurements based on graphical representations and statistical tables that are used to depict the existing condition and future research possibilities. Filtering models were used to show the works, authors, organisations, nations, and journals in the field throughout data collecting. The key components of the network of citations and co-appearances were examined. For this study total 10 years (2013 to 2022) of published articles data were observed, all the data were extracted from Dimension Database. The researcher used only one keyword 'Physiotherapy' to search the data. The data was downloaded on 15 September 2023 and produced an initial selection of 23887 publications. For the data collection check list were used a research tool, while VOS Viewer software was used for data analysis.

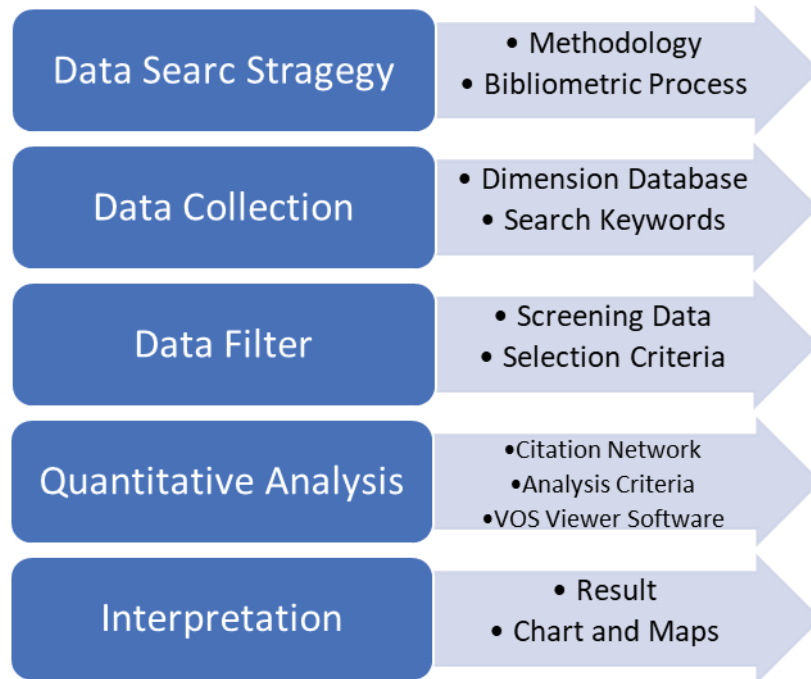


Figure 1: Steps of conducting bibliometric research⁷

6. DATA ANALYSIS & INTERPRETATIONS:

6.1. YEAR WISE PUBLICATION:

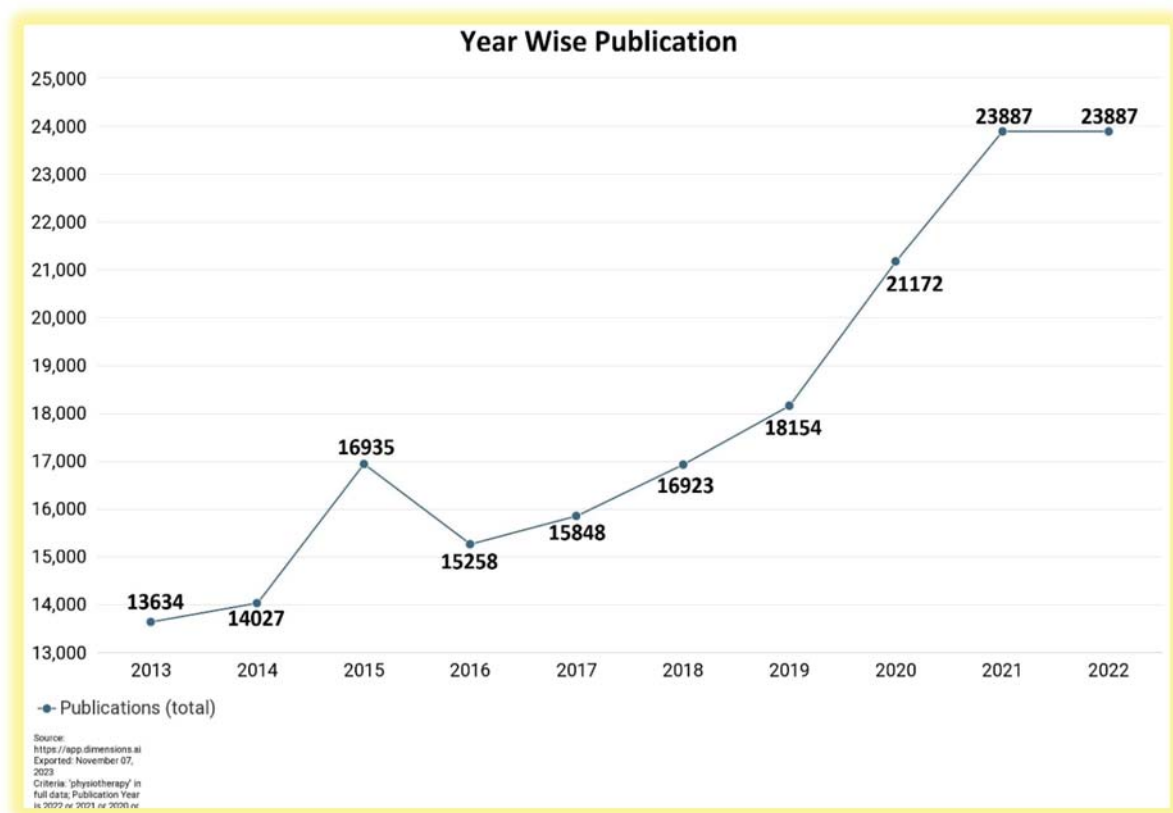
Table 1: Year wise Publication

Sr. No.	Year	Total No. of Articles
1	2013	13634
2	2014	14027
3	2015	16935
4	2016	15258
5	2017	15848
6	2018	16923



7	2019	18154
8	2020	21172
9	2021	23887
10	2022	23887

Table 1 and graph 1 show the data of articles published and indexed in Dimension database during the year 2013 to 2022. Till 2013 total 13634 published articles were indexed in Dimension database in the field of Physiotherapy. In the same flow till 2022 total 23887 published research articles were indexed in Dimension database.

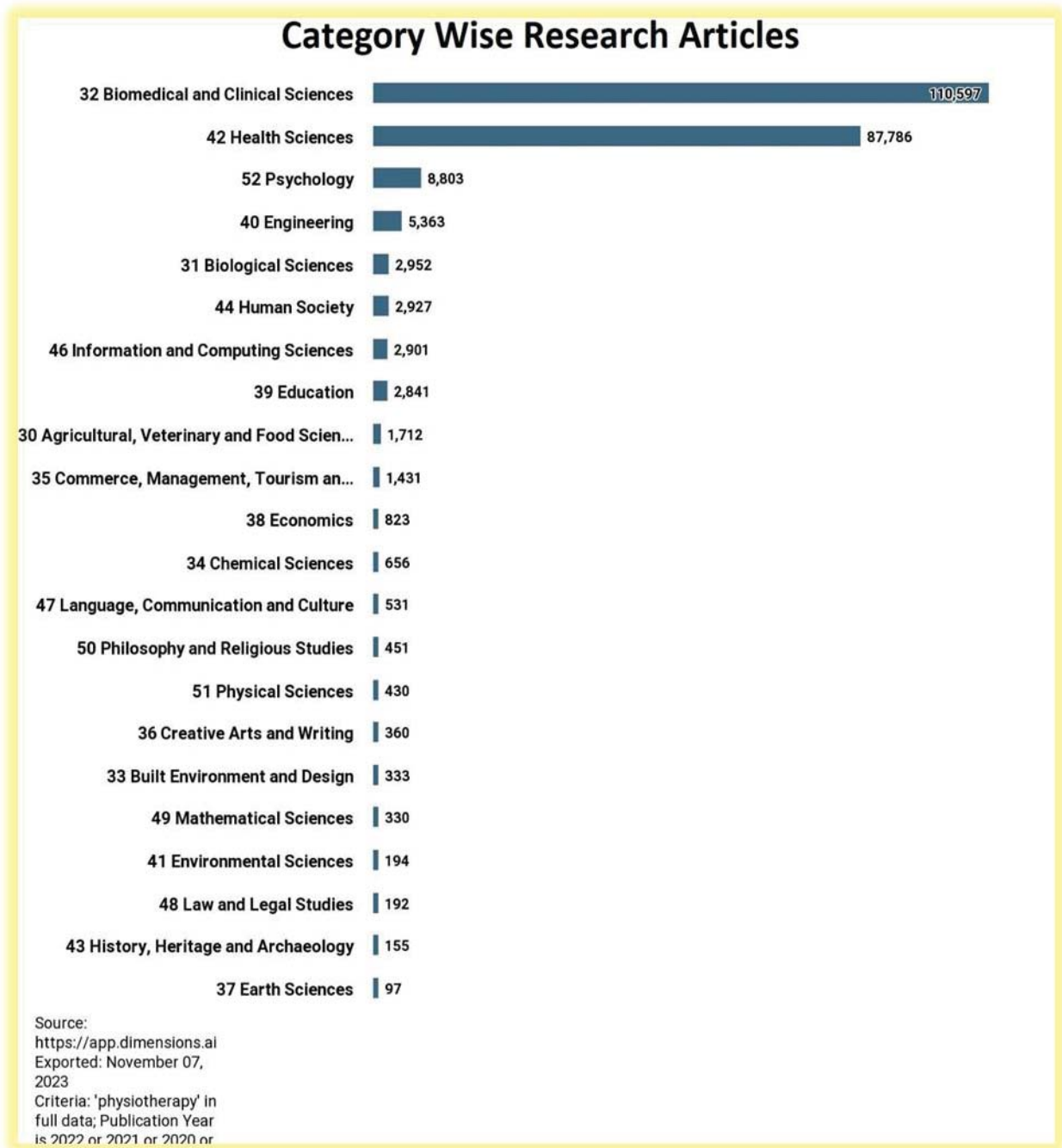


Graph 1: Year wise Publication⁸



6.2. CATEGORY WISE NUMBER OF PUBLICATION:

Graph 2 shows that the published articles are divided into more than 22+ different categories which are indexed in Dimension database.

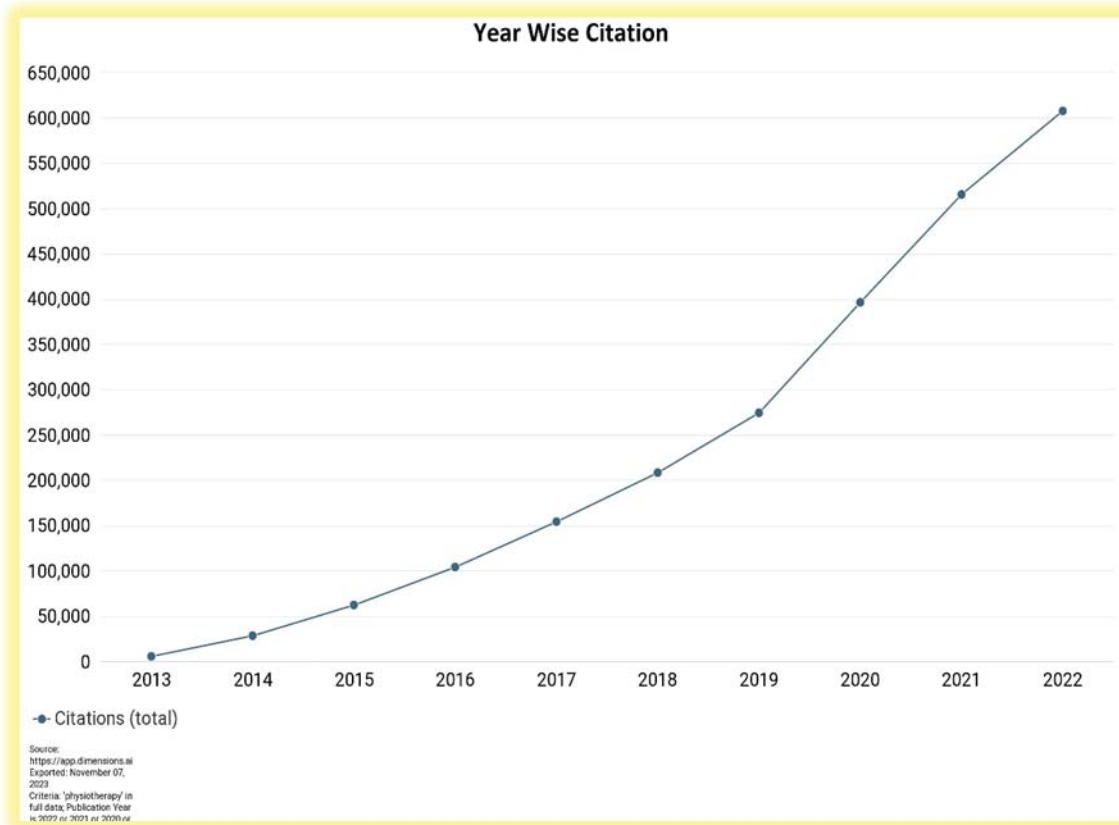


Graph 2: Category wise Number of Publication



6.3. YEAR WISE CITATION:

Graph 3 present the data about the year wise data of citations of published articles.

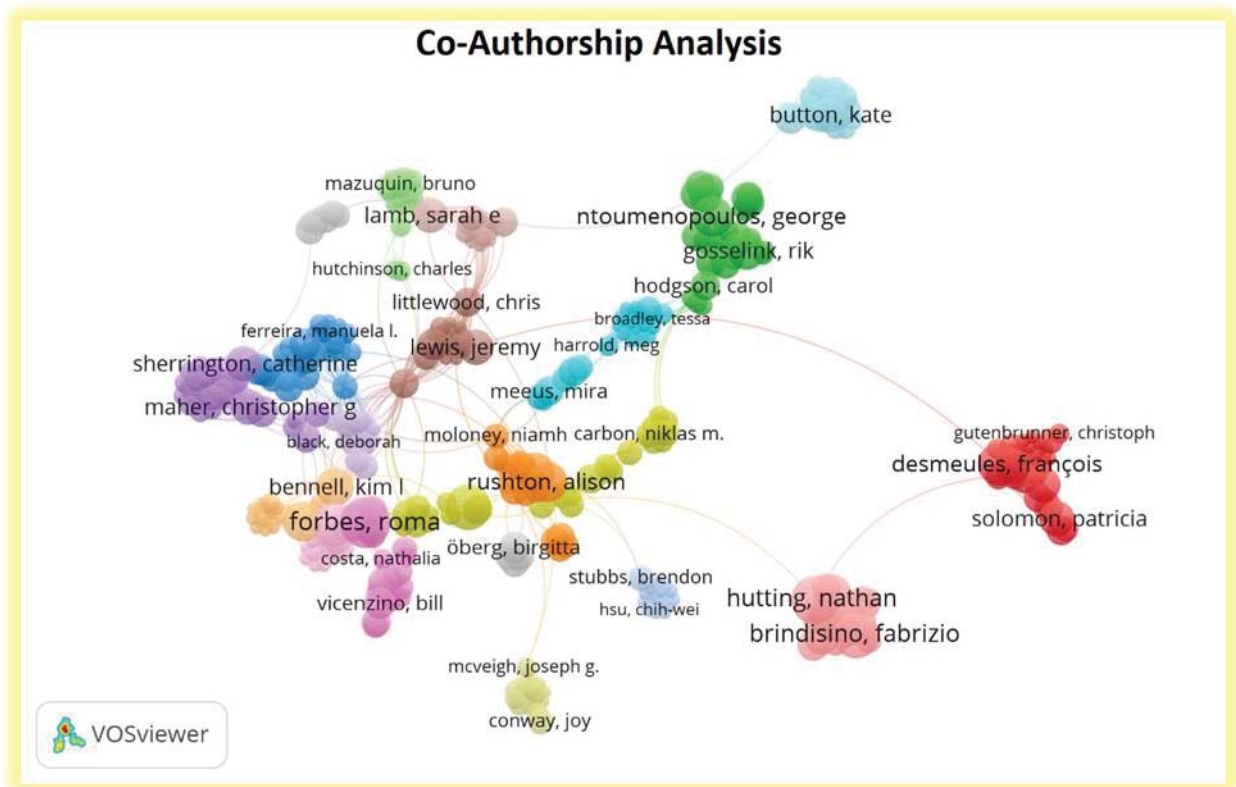


Graph 3: Year Wise Citation

6.4. CO-AUTHORSHIP ANALYSIS - AUTHOR WISE

Graph 4 present the author wise Co-authorship analysis of the research articles published on Physiotherapy discipline. The data were set in VOS viewer, minimum number of articles of an author at the level 1 and minimum number of citations of an author at the level of 0. Total 11837 authors were found in the source data, out of them 11837 meet the thresholds. Therefore, each of the 11837 authors, the total strength of the co-authorship links with other authors will be calculated. Out of 11837 top 1000 authors with the greatest total link strength will be selected. However, some of the 1000 items in the network are not connected to each other. The largest set of connected items consist of 404 items. In this author wise co-authorship analysis top three authors found according to their published articles, citations and

total link strength. Catherine Sherrington got highest rank with 6 articles, 32 citations and 50 total link strength; followed by Christopher G. Maher got second highest rank with 6 articles, 27 citations and 48 total link strength; while Nadine Foster got third highest rank with 4 articles, 12 citations and 47 total link strength.

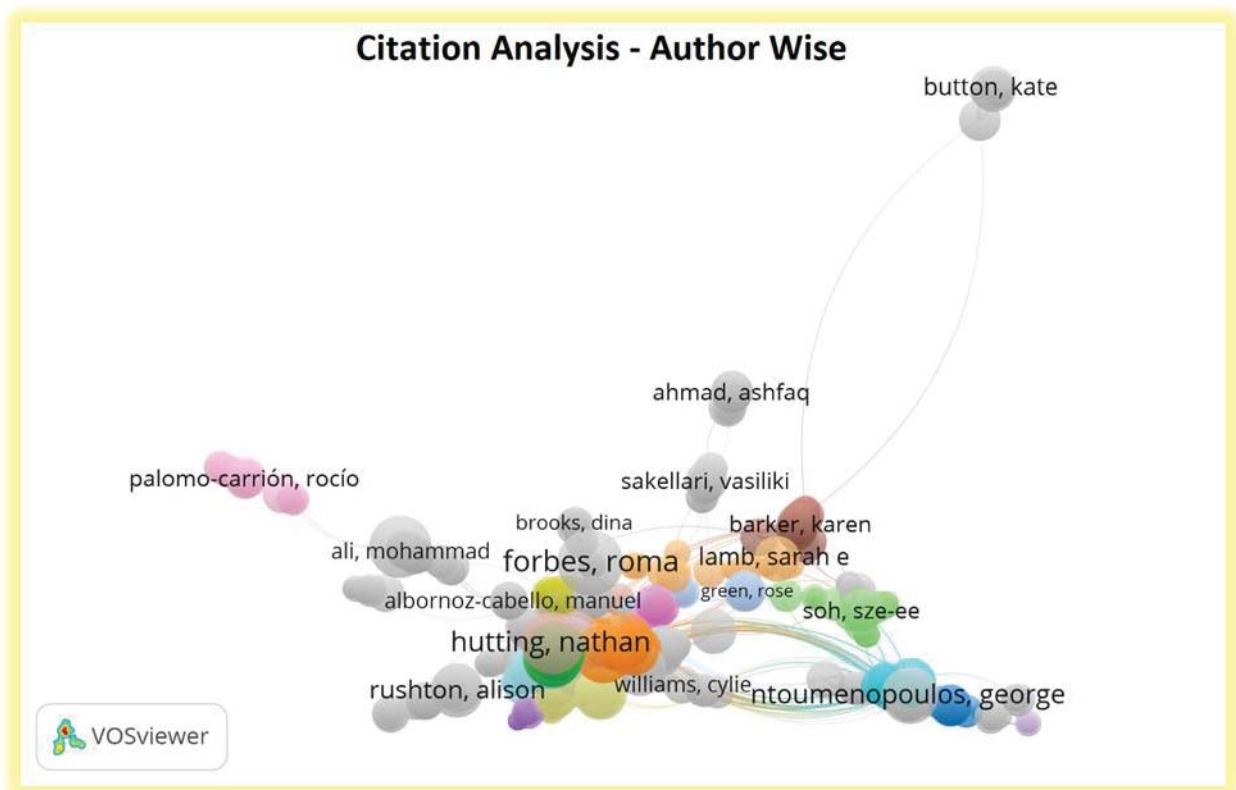


Graph 4: Co-authorship Analysis – Author Wise

6.5. CITATION ANALYSIS - AUTHOR WISE:

Graph 5 present the author wise citation analysis of the research articles published on Physiotherapy discipline. The data were set in VOS viewer, minimum number of articles of an author at the level 1 and minimum number of citations of an author at the level of 0. Total 12167 authors were found in the source data, out of them 12167 meet the thresholds. Therefore, each of the 12167 authors, the total strength of the citation links with other authors will be calculated. Out of 12167 top 1000 authors with the greatest total link strength will be selected. However, some of the 1000 items in the network are not connected to each other. The Largest set of connected item consist of 882 items. In this author wise citation analysis

top three authors found according to their published articles, citations and total link strength. George Natoumenopoulos got highest rank with 9 articles, 154 citations, and 225 total link strength; followed by Trevor Russell got second highest rank with 9 articles, 140 citations, and 186 total link strength; while Nathan Hutting got third highest rank with 11 documents, 131 citations, and 184 total link strength.



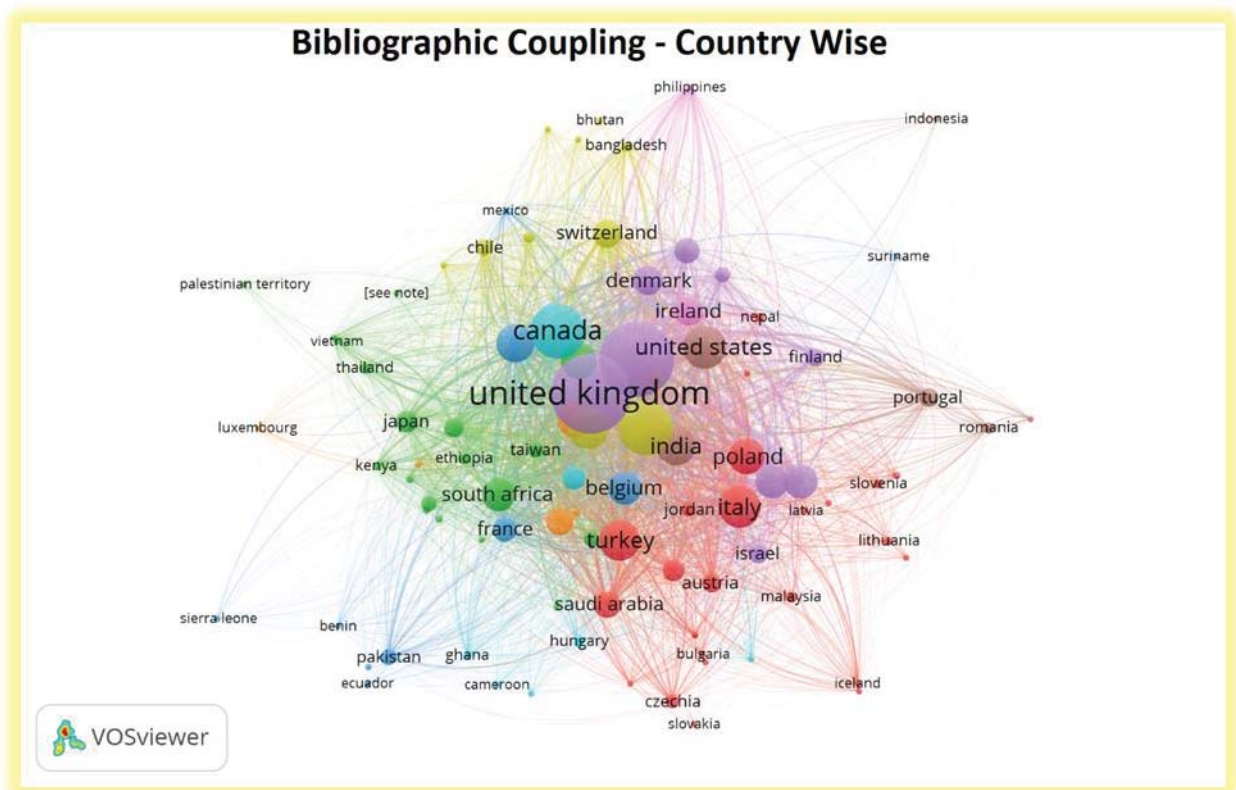
Graph 5: Citation Analysis – Author Wise

6.6. BIBLIOGRAPHIC COUPLING – COUNTRY WISE:

Graph 6 present the country wise bibliographic coupling of the research articles published on Physiotherapy discipline. The data were set in VOS viewer, minimum number of articles of an organization and minimum number of citation of an organization both were set at level 1. Total 97 countries were found in the source data, out of them 95 meet the thresholds. Therefore each of 95 countries, the total strength of the bibliographic coupling links with other countries will be calculated. The country with the greatest total link strength will be

selected. However 1 item is not connected to other items, so the largest set of connected items consists of 94 items.

In this country wise bibliographic coupling top three country found according to their published articles and citations. United Kingdom got highest rank with 420 articles and 2027 citations, followed by Australia got second highest rank with 374 articles and 1793 citations, while Canada got third highest rank with 194 articles and 983 citations.



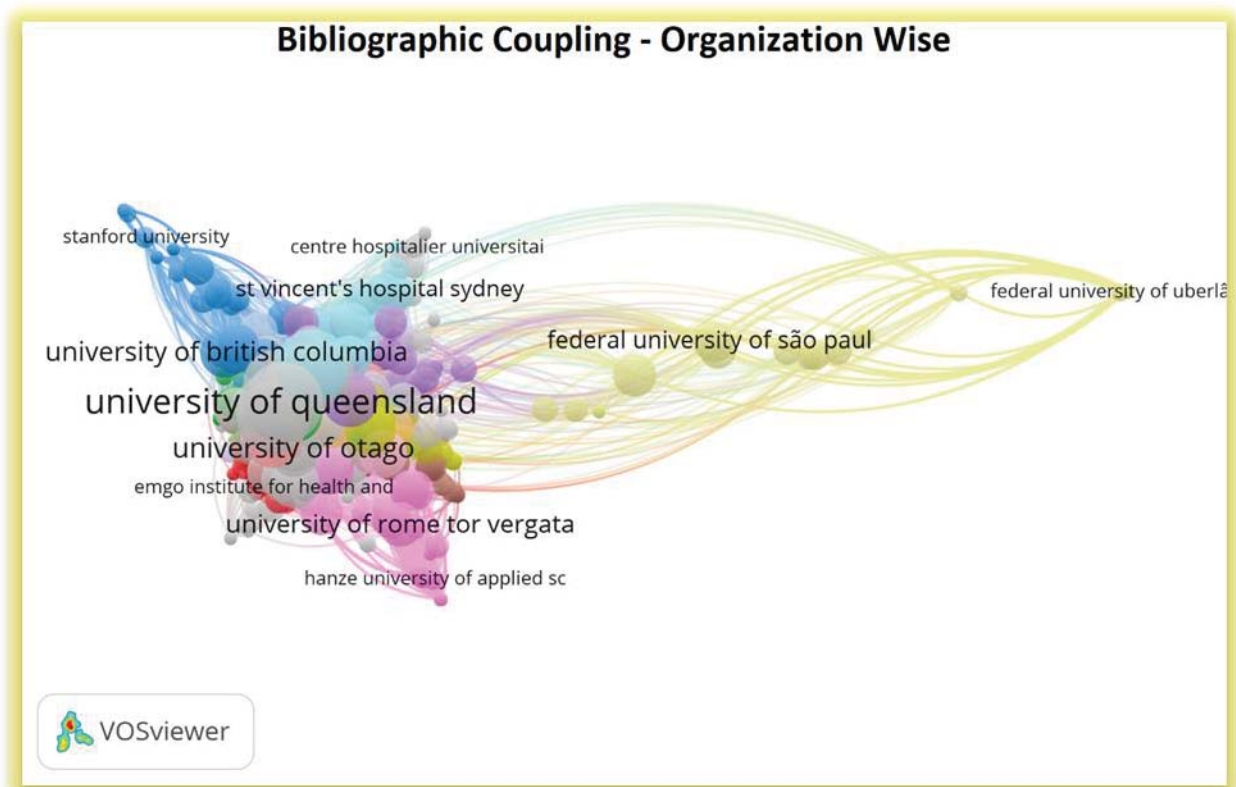
Graph 6: Bibliographic Coupling – Country wise.

6.7. BIBLIOGRAPHIC COUPLING – ORGANIZATION WISE

Graph 7 present the organization wise bibliographic coupling of the research articles published on Physiotherapy discipline. The data were set in VOS viewer, minimum number of articles of an organization and minimum number of citation of an organization both were set at level 1. Total 4040 organizations were found in the source data, out of them 3496 meet the thresholds, but top 1000 organization with the greatest total link strength will be selected for this analysis. In this analysis 1000 organizations were distributed into 36 cluster, with



194610 links and 1343806 total link strength. In this organization wise bibliographic coupling top three organization found according to their published articles, their citations, and total link strength. University of Queensland got highest rank with 73 articles, 458 citations and 38867 total link strength; University of Melbourne got second highest rank with 57 articles, 456 citations and 38772 total link strength; while The University of Sydney got third highest rank with 61 articles, 349 citations and 36310 total link strength.



Graph 7: Bibliographic Coupling – Organization Wise

7. MAJOR FINDINGS:

- The most noticeable author of the Co-authorship analysis for their research performance was Catherine Sherrington with their contribution of 6 articles, 32 citations and 50 total link strength.
- The most noticeable author of citation analysis for their research performance was George Natoumenopoulos with their contribution of 9 articles, 154 citations, and 225 total link strength.



- The most noticeable country for the research performance was the United Kingdom, with a contribution of 420 articles and 2027 citations.
- The most noticeable organization for the research performance as the University of Queensland with a contribution of 73 articles, 458 citations and 38867 total link strength.

8. SUGGESTIONS:

There is a need to inspire scientists from Physiotherapy discipline to contribute research in this discipline and to put this knowledge into practice.

9. RECOMMENDATION:

In this research, the limitation includes the fact that only the Dimension database was searched for relevant data. Therefore, for further research using databases such as Web of Science, Scopus and others is recommended.

10. CONCLUSION:

This study provides a comprehensive examination of global scholarly publishing output in research on Physiotherapy by analyzing records from Dimension database during 2013 to 2022 with the combination of bibliometric tools through VOSviewer. This research analyzes the year wise publication, category wise number of publications, year wise citations, author wise co-authorship analysis, author wise citation analysis, country wise bibliometric coupling and organization wise bibliometric coupling. On the basis of findings, it is concluded that Catherine Sherrington is the most noticeable author in Co-authorship analysis, George Natoumenopoulos is most noticeable author in citation analysis, and the most noticeable country is United Kingdom in country wise bibliographic coupling, while most noticeable organization is University of Queensland in organization wise bibliographic coupling.



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