Original article

The Mapping of scientific work publications of lecturers indexed by Scopus for Undergraduate Medical Study Programs in DKI Jakarta

Mapeo de las publicaciones de trabajos científicos de los profesores indexados por Scopus para los programas de estudios médicos de pregrado en DKI Jakarta

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ABSTRACT

Medical lecturers do not only focus on treating, but also conduct research that can be used to produce new findings. This study aims to map the development of research topic trends in Scopus indexed scientific articles produced by lecturers of the Undergraduate Medical Study Program in DKI Jakarta, map the collaboration relationship between lecturers of the Undergraduate Medical Study Program in DKI Jakarta in writing scientific articles, explain the level of citation productivity and Scopus indexed articles produced. Data were obtained from the Higher Education Database and Scopus. Data were processed using Microsoft Excel and visualization with VOSviewer. This study found that there were 1,274 articles from

297 medical lecturers from 11 universities. The highest occurrence of keywords were "Human", "Male", "Female", "Controlled Study", "Adult". Authors with the most strength of collaboration relationships are Suyatna, F.D., Djuardi, Y., Supali, T. Lecturers with the most citations are Pranata, R. Lecturers with the most Scopus indexed scientific articles based on complete counts are Suyatna, F.D. Through this research, it can be concluded that collaborative relationships can be carried out based on research interests, not based on one alma mater. Lecturers with the most Scopus indexed articles do not mean they have high citations. The eleven universities in DKI Jakarta have not been productive enough in producing Scopus indexed articles. Therefore, research from medical lecturers still needs to be improved so that the results of research are more varied, students at the university also increase with new or developing knowledge, and the responsibility for research and development continues, and helps favor the university.

Keywords: scopus indexed; lecturer; medical study program; DKI jakarta; scientometrics.

RESUMEN

Los profesores de medicina no sólo se centran en el tratamiento, sino que también realizan investigaciones que pueden utilizarse para producir nuevos hallazgos. Este estudio tuvo como objetivo mapear el desarrollo de las tendencias de los temas de investigación en artículos científicos indexados en Scopus, producidos por profesores del Programa de Estudios Médicos de Pregrado en DKI Jakarta. La relación entre docentes del Programa de Estudios de Pregrado en Medicina en DKI Jakarta al escribir artículos científicos, explica el nivel de productividad de citas y los artículos indexados en Scopus. Los datos se obtuvieron de la Base de Datos de Educación Superior y Scopus. Se procesaron utilizando Microsoft Excel y visualización con VOSviewer. Este estudio encontró que había 1274 artículos de 297 profesores de medicina de 11 universidades. La mayor aparición de palabras clave fue "humano", "hombre", "mujer", "estudio controlado" y "adulto". Autores con las relaciones de colaboración más sólidas son Suyatna, F.D., Djuardi, Y., Supali, T. Los conferenciantes con más citas son Pranata, R. El profesor con más artículos

científicos indexados en Scopus, basados en información completa, fue Suyatna, F.D. A través de esta investigación se pudo concluir que las relaciones de colaboración se pueden llevar a cabo con base a intereses de investigación. Los profesores con más artículos indexados en Scopus no significa que tienen altas citas. Las once universidades de DKI Jakarta no han sido lo suficientemente productivas en la producción de artículos indexados en Scopus. Por lo tanto, aún es necesario mejorar la investigación de los profesores de medicina para que los resultados de investigación sean más variados; los estudiantes en la universidad también desarrollen nuevos conocimientos; la responsabilidad de la investigación y el desarrollo continúa, lo que favorece a la universidad.

Palabras clave: indexado en Scopus; conferenciante; programa de estudios médicos; DKI Jakarta; cienciometría.

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Introduction

Scientific work is defined as writing that comprises research findings that have been demonstrated to be true based on existing data and facts, and that is objective.[1] Scientific work is a product in the style of an essay in science, complete with suitable technique and guidelines or writing norms that must be followed, and it can be used to communicate amongst authors in relevant fields of science.[1] Scientific work is inextricably linked to the realm of education, particularly universities. Academics are required to publish their scientific work for universities. The publication of scientific work by students and professors has the potential to improve the reputation and accreditation of higher education institutions.

Publication of scientific works also contributes to the development of the Tri Dharma of Higher Education in terms of research.[2]

The Tri Dharma of Higher Education is generally known as the tasks, main points, and functions that universities in Indonesia are responsible for. There are three responsibilities in Tri Dharma, namely (1) Education and teaching, (2) Research and development, (3) Community service. In implementing the Tri Dharma of Higher Education, the role of the academic community, namely lecturers and students, is needed. Teachers and Lecturers states that lecturers must engage in education, research, and community service in order to maintain their professionalism.[3] Lecturers are the primary resource in higher education and play a critical role in fulfilling the vision and goal of higher education.[4] Lecturers must be able to publish scientific work, one of which is in the form of scientific articles in recognised journals, because superior research for academics is a means of achieving greatness in higher education.[4] This surely applies to any higher education programme, including medicine.

Medical education is inextricably linked to research and development. This assertion is corroborated by international study findings on the half-life of scientific effort in numerous scientific disciplines, including medicine, which has a half-life of 6.8 years.[5] The findings of the study could be published in national and international journals. Indonesia has a Scopus-like database and indexer of accredited national journals called Science and Technology Index (SINTA). The Science and Technology Index (SINTA) is an Indonesian database and indexer for approved national journals. There are various databases and indexers of respected international journals available on a global scale, two of which are Scopus and Web of Science.

Scopus is the primary focus of the SINTA assessment, in addition to being an indexer of international journals. Scopus is said to have a greater impact than SINTA.[6] The application of SINTA is comparable to a little to mild rise in high impact Scopus indexed publications, but a substantial increase in low impact Scopus indexed journals.

In 2021, Indonesia is ranked 40th out of 225 countries in the medical subject area (medicine) based on data in Scopus with 6726 documents, after Singapore (8045), Malaysia (7979), Thailand (7840), Hong Kong (7264), and Finland (7131).[7] Indonesia has experienced an increase compared to the previous five years; namely, in 2016, Indonesia was ranked 52nd out of 222 countries in the medical subject area (medicine). Currently the capital of Indonesia is located in DKI Jakarta and according to the Ministry of Education Culture Research and Technology, by 2022/2023 there will be 64 universities in DKI Jakarta province.[8] After further investigation, there are 11 universities that have Medical Study Programs. The existence of these study programs can contribute to research results that have an impact on the number of article publications and the development of medical science. Research or research that must be produced by lecturers in the field of medicine is very important, because there are medical lecturers who not only focus on treating, but also conduct research that can be used to produce new findings.

Based on the previous explanation, this study aims to (1) map the development of research topic trends in Scopus indexed scientific articles produced by lecturers of the Undergraduate Medical Study Program in DKI Jakarta, (2) map the collaboration relationship between lecturers of the Undergraduate Medical Study Program in DKI Jakarta in writing scientific articles, (3) explain the level of citation productivity and Scopus indexed articles produced by lecturers of the Undergraduate Medical Study Program in DKI Jakarta. Supporting the objectives of this study, researchers, scientists, and funding agencies involved in developing strategies to address health problems can be helped by useful information generated from bibliometric analysis.[9,10]

Literature review

Galyani-Moghaddam *et al.*[11] conducted a study entitled "Publications by Faculty Members Indexed in Science Citation Index and Scopus: An Iranian Case Study" aimed to identify scientific publications by faculty members of Allameh Tabataba'i University indexed in two international databases, Science Citation Index and Scopus, from the year the databases first included papers written by Iranians (1987

and 1989, respectively) until the end of 2015. This research uses scientometric methods and social network analysis techniques to analyze co-authorship networks. This research used Microsoft Excel, HistCite, VOSviewer, and Pajek software. The results found in this study are that faculty members have the most international cooperation with colleagues from the United States and Switzerland, and they co-author papers with faculty and staff from other universities in Iran. The three institutions with the highest co-authorship rates included Islamic Azad University, Tehran University, and Amir Kabir University of Technology.

Mafa conducted research aimed at assessing the productivity of scientific works of UIN KHAS Jember lecturers in Scopus indexed journals.[12] This research uses a descriptive method with bibliometric analysis. This research also uses VOSviewer software to visualize the data obtained. The results obtained in the research are found that the naming of UIN KHAS Jember affiliation in Scopus is inconsistent. Not all scientific works produced are collaborations of lecturers. However, there are lecturer collaborations carried out with various institutions from within and outside the country.

Puspitaningtyas *et al.*[13] conducted scientometric research that aims to address the ignorance gap of cancer research across Indonesia. This study took 1773 cancer-related articles published by authors affiliated with Indonesia from 1961-2020. The method used in this study was scientrometric with descriptive analysis to determine the annual growth patterns in publications across cancer research conducted in Indonesia. This study developed a classification system for the type and design of research applied to existing publications. The study used VOSviewer software to visualize the distribution of research, as well as using the Wilcoxon rank-sum test to determine the influence of international collaboration on the impact of the journal in which the article was published. The results found an increase in the number of articles published each year starting from 2015. Most of the articles were published by authors affiliated with institutions in Java (84.0%). The types of articles published were basic research and discovery science (28.8%).

Methods

Database

This study used two databases for data collection. The first is the Higher Education Database (PDDikti) https://pddikti.kemdikbud.go.id/. PDDikti is a database of higher education institutions in Indonesia that is managed directly by the Directorate General of Higher Education under the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia. PDDikti provides information on study programs, lecturers, and students from universities throughout Indonesia. This is useful, as this research requires a list of names of university lecturers.

The second database is Scopus, used to collect articles written by lecturers and indexed in Scopus. The advantage of Scopus is that it has complete bibliometric data for its indexed publications,[14] a consistent set of documents and further features, such as affiliation and country of authorship.[15] For bibliometric reviews, these scientific databases are often suggested[16] and sources from Scopus are recognized as high quality for bibliometric data.[17]

Search Process

Collecting the list of lecturer names in PDDikti is done by entering the name of the university in the search menu, then selecting the name of the university being searched. Select the study program "Medicine" or "Medical Education" with the status information "active" and the level "Strata 1 (S1)". Select the list of lecturers. The data retrieved is in the form of lecturer names, lecturer education, and the number of lecturers in the university.

After collecting the list of lecturers' names, collect the metadata of scientific publications of the lecturers' articles through the Scopus database by entering the full name of the lecturer in the Author search menu without entering the affiliation name. After finding the appropriate profile, click the number on the documents. Next, limit is year 2022 (if there is already a publication published in 2023), author

name, document type (select article), and publication stage (select final). Then click "limit to". After that, click all of these options (citation information, bibliographical information, abstract & keywords, funding details, and other information), and select export with CSV and RIS formats.

Software and Technique

This study used three tools. (1) Microsoft Excel was used for citation analysis and PivotTable with a complete count, i.e. the count was done by assigning a value of one to all authors,[18] (2) VOsviewer is a free access program developed by Nees Jan Van Eck and Ludo Waltman to view and visualize bibliometric maps.[19] The main advantage of VOSviewer is that it focuses more on graphical representation of data than other programs.[20] This is useful for visualizing thousands of items, making it easier to interpret the map.[19,21] VOSviewer supports reference manager files, such as RIS, EndNote, and RefWorks.[22] This is very important for the usefulness of this research, because it uses (3) Mendeley as one of the auxiliary tools at the data screening stage. The type of analysis used in this research using VOSviewer is co-authorship to determine the author collaboration relationship and co-occurrence to determine the trend of research topics.[23]

During the visualization process using VOSviewer, a thesaurus file is also created which is used for cleaning the generated keywords.[22] The thesaurus file consists of two columns, namely the label column (the label you want to replace) and the replace by column (alternative labels) (figs. 1, 2, table 1).

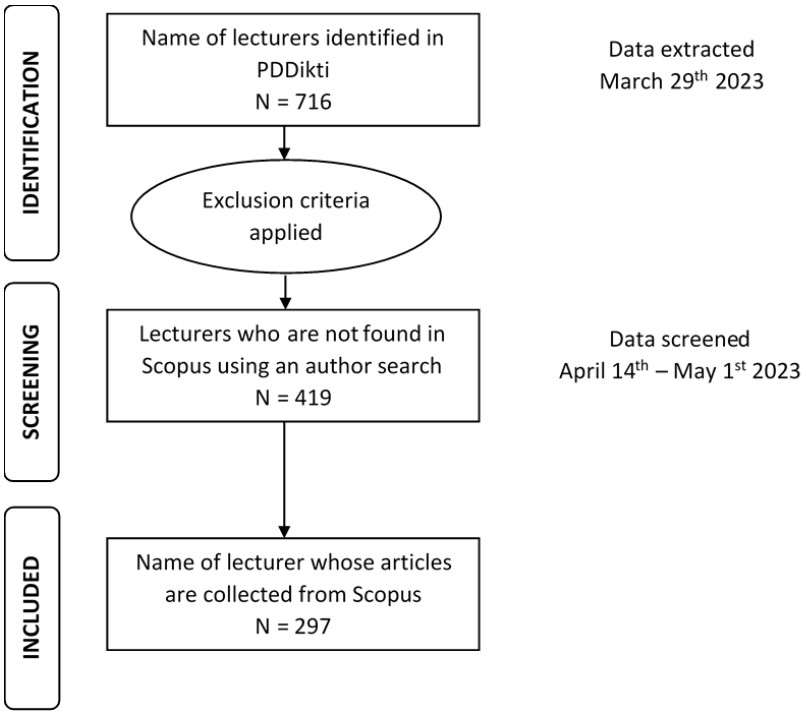

Fig. 1 – Strategy for collecting lecturers' name.

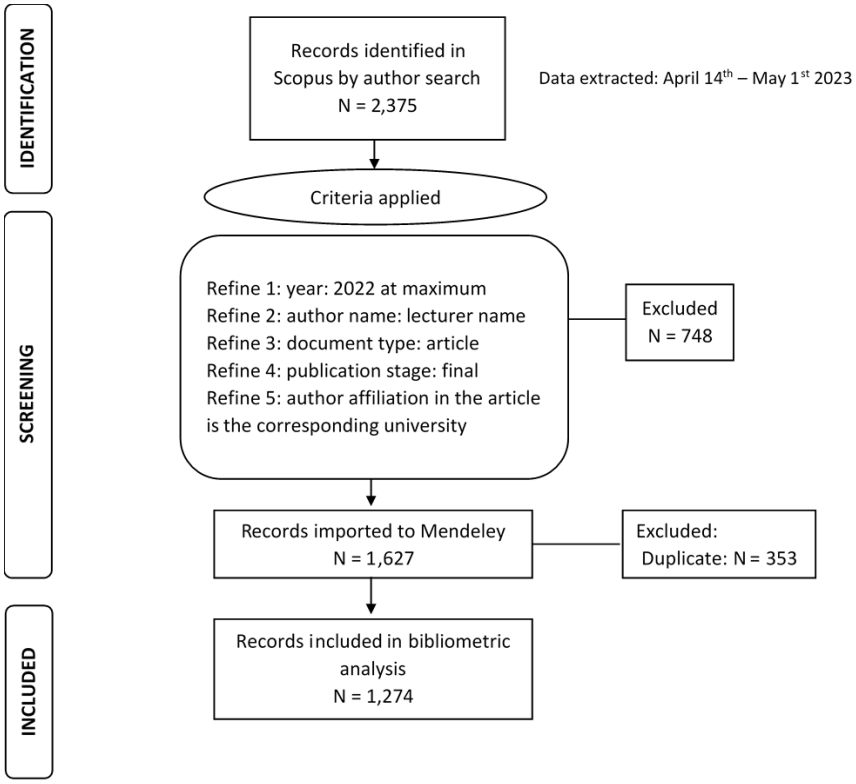

Fig. 2 – Strategy for collecting lecturer records on Scopus.

Table 1 - Thesaurus for data screening

Label	Replace By
Animals	Animal
Covid-19	Coronavirus disease 2019
Cross-sectional studies	Cross-sectional study
Humans	Human
Risk factors	Risk factor

Results

Trends in research topics in articles

The entire metadata of Scopus-indexed articles for lecturers in the Undergraduate Medical Study Programme in DKI Jakarta and surrounding areas produces 66 keywords from 5 cluster (figs. 3, 4). Table 2 shows the top ten keywords based on the largest number of occurrences.

Table 2 - Keyword Order Based on the Largest Occurrence Number

No.	Keywords	Occurrences
1	Human	735
2	Male	535
3	Female	465
4	Controlled study	438
5	Adult	433
6	Indonesia	283

7	Nonhuman	264
8	Major clinical study	223
9	Middle aged	214
10	Clinical article	172

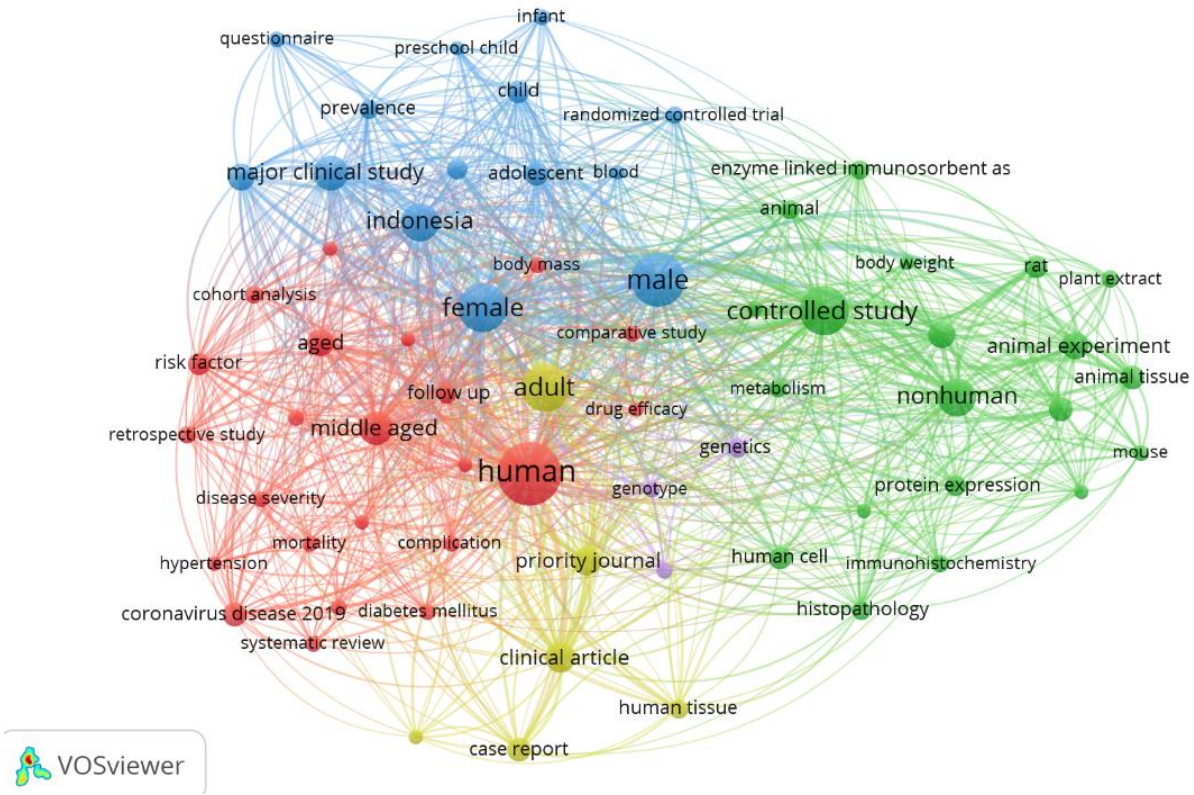

Fig. 3 – Trends in research topics in articles based on keywords.

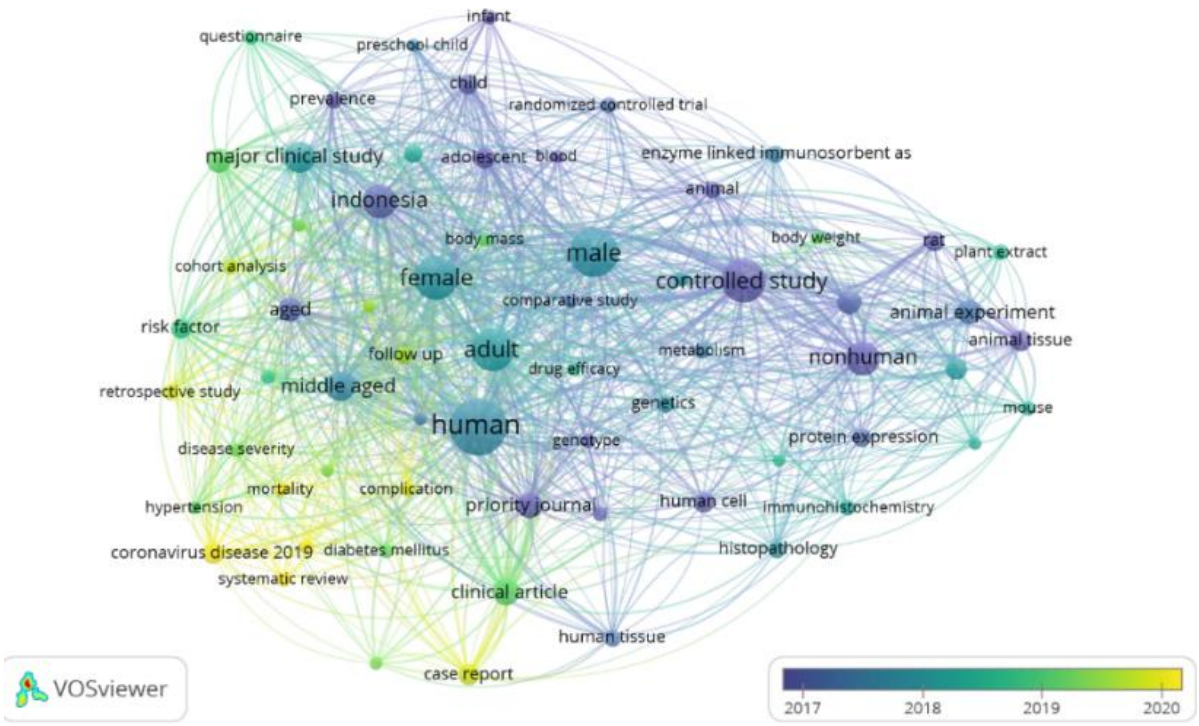

Fig. 4 – Overlay visualization of research topic trends in articles based on keywords.

Collaborative author relationships

According to the results, 319 writers have at least 5 documents, but only 310 authors are connected to one another and organised into 20 clusters. Table 3 shows the first ranked authors in each cluster.

Table 3 - The First Ranked of Authors Based on Link Strength in Each Cluster

Cluster	Universities	Author (lecturer)	Document	Total Link Strength
1	Pelita Harapan University	Kurniawan A	34	70
2	None at time of data collection	Kusmardi K	34	76
3	University of Indonesia	Suyatna F D	71	180
4	None at time of data collection	Prasasty V D	18	38
5	University of Indonesia	Djuardi, Y.	34	166
6	University of Indonesia	Saraswati M	16	29
7	Indonesian Christian University	Wahyuningsih R	23	98
8	University of Indonesia	Arsianti A	46	132

9	UIN Syarif Hidayatullah	Sari FR	14	40
10	None at time of data collection	Abdullah M	11	30
11	None at time of data collection	Sungkar S	15	106
12	University of Indonesia	Safitri E D	12	39
13	University of Indonesia	Jasirwan C O M	14	55
14	None at time of data collection	Rasyid A	14	56
15	University of Indonesia	Subahar R	10	20
16	None at time of data collection	Gunardi H	10	44
17	YARSI University	Yuliwulandari R	26	49
18	Affiliations were not included in the study limitations	Rosadi I	9	42
19	None at time of data collection	Birowo P.	23	56
20	University of Indonesia	Kodrat E.	10	8

Source: Primary data processed by researchers, 2023.

Level of citation productivity and articles produced

The productivity of authors and universities of Undergraduate Medical Study Programs in Jakarta and surrounding areas in producing Scopus indexed articles was carried out by complete count (table 4). Processed using Microsoft Excel and analyzed using PivotTable.

Table 4 - The Most Productive Authors Based on Complete Count

No.	Universities	Lecturer Name	Number of articles
1	University of Indonesia	Franciscus D. Suyatna	73
2	University of Indonesia	Ade Arsianti	48
3	University of Indonesia	Yenny Djuardi	34
4	Pelita Harapan University	Andree Kurniawan	31
5	Pelita Harapan University	Julius July	29
6	YARSI University	Rika Yuliwulandari	29
7	University of Indonesia	Ria Margiana	26

8	University of Indonesia	Aryo Tedjo	26
9	University of Indonesia	Widi Atmoko	26
10	Indonesian Christian University	Retno Wahyuningsih	25

The top 10 lecturers (authors) with the highest number of citations from each cluster (table 5). It can be seen that most authors with a high average number of citations have a small number of articles.

Table 5 - The Ranking of the Most Productive Citation Lecturers Based on the Largest Average Citations Number

No.	Cluster	Author	Documents	Citations	Total Link Strength	Average Citations
1	3	Pranata R	27	895	63	33.1
2	4	Djuardi Y	33	892	775	27.0
3	7	Kurniawan A	35	779	126	22.3
4	9	Yuliwulandari R	26	535	234	20.6
5	6	Wahyuningsih R	21	405	100	19.3
6	2	Freisleben H-J	10	137	13	13.7
7	8	Kiranasari A	5	35	5	7.0
8	1	Suyatna FD	71	454	48	6.4
9	10	Rosadi I	10	51	99	5.1
10	5	Arsianti A.	45	208	165	4.6

The ranking of the most productive universities is based on the largest average figures. The average figures are generated by the formula of the number of articles

divided by the number of lecturers. The University of Indonesia is the most productive university, determined based on the largest average number. (Table 6).

Table 6 - The Ranking of the Most Productive Universities Based on the Largest Average Figures

No.	Universities	Number of Articles	Number of Lecturers	Average
1	University of Indonesia	810	68	11.9
2	Pelita Harapan University	228	34	6.7
3	Atma Jaya Indonesian Catholic University	122	30	4.1
4	UIN Syarif Hidayatullah Jakarta	95	24	4.0
5	Indonesian Christian University	47	13	3.6
6	YARSI University	104	32	3.3
7	Gunadarma University	20	7	2.9
8	Tarumanagara University	28	11	2.5
9	Jakarta Veteran National Development University	61	27	2.3
10	Muhammadiyah University Jakarta	27	12	2.3
11	Trisakti University	87	39	2.2

Discussion

In compliance with research limits, this study focuses on the publication of Scopus indexed scientific articles created by lecturers at the Undergraduate Medical Study Programme at DKI Jakarta and adjacent locations. This study is a blend of scientometric analysis and bibliometric analysis (usage of complete count); various other studies use this combination as well.[11,12,20,24] When collecting article

metadata in Scopus, a search is carried out using the full name of the lecturer, after which it is looked at through the documents held. Furthermore, it was found that the writing of the names of university affiliates was inconsistent. This was also found in research by Mafa on the naming of the affiliate of Kiai Haji Achmad Siddiq Jember State Islamic University in Scopus.[12] A total of 1,627 article metadata were collected from 297 teachers in the Undergraduate Medical Study Programme, with a complete count beginning in 1993 and ending in 2022, the first year a lecturer's article was indexed in Scopus. The article metadata became 1,274 after the merger.

There are several similarities between the keyword results and the research by Aminy, which is unique in that it makes use of the metadata from scientific work articles issued by the top 10 Indonesian universities according to the QS World University Rankings 2022 and indexed in the PubMed.gov database.[25] The essential phrases include "humans", "females", "males", "adults", "middle-aged people", "Indonesia", "animals", "adolescents", "Indonesia/epidemiology", as well as "cross-sectional studies".

Each cluster in figure 3 has a keyword association. COVID-19 is linked to hypertension and diabetes mellitus in Cluster 1 (red), which is one of the factors that can influence complications and death. Aside from that, it is also determined by the severity of the sickness. This is supported by the research of Mahamat-Saleh et al.[26] claims that those who have Covid-19 and also have hypertension, diabetes, or obesity have a greater risk of dying. Because the virus from Coronavirus illness 2019 infects humans, the keyword Coronavirus disease 2019 has a high link strength with humans (92). Cluster 2 (green) is concerned with medical or biochemical research; this research employs controlled studies and experimental materials including nonhuman animals such as mice. Cluster 3 (blue) is divided into subjects commonly utilized in study, such as gender categories (female, male), age categories (baby, child, young adult, adolescent), and so on.

Figure 4 shows that terms in dark colours are from 2017 and below, while keywords in light colours are from 2020 and above, based on an overlay analysis. Coronavirus illness 2019 is depicted in yellow because it occurred only 3.5 years ago and research in the field of medicine received more attention during the COVID-19

pandemic.[27] In addition, the first COVID-19 case was discovered in Indonesia in 2020. This is different from the appearance of the keyword results from Khuluq et al. The one featured in early 2020 after “humans” was “SARS-CoV-2” followed by “COVID-19”.[28] This happened because there were differences in data collection, namely by entering the keyword "SARS-CoV-2," which is the name of the virus from the COVID-19 disease.

The researcher chose one author from each of the 20 clusters with the highest link strength figure, bringing the total to 20 authors, as shown in Table 3. Based on the examination of the 20 writers, it was discovered that authors affiliated with the University of Indonesia had the highest connection strength in each cluster as many as eight authors. Authors with the same affiliation did not necessarily collaborate in writing scientific articles, according to subsequent study of the author network. Suyatna FD (University of Indonesia) and Yuliwulandari R (YARSI University) have collaborated twice, as have Kurniawan A (Pelita Harapan University) and Kodrat E (University of Indonesia). Aside from that, it was established that Kurniawan A and Kodrat E had both studied medicine at the University of Indonesia. Meanwhile, Suyatna FD, and Yuliwulandari R were both studying medicine at various universities.

Total link strength is the total number of authors who collaborate. Suyatna FD has 71 articles with a total link strength of 180, Djuardi Y has 34 pieces with a total link strength of 166, and Arsianti A has 46 articles with a total link strength of 132. Based on these statistics, it is clear that authors with a high total link strength have a big number of publications. This is in line with the statement of Cainelli et al.; Sugimoto and Cronin in Drongstrup, that authors who co-author tend to produce a large number of publications.[29]

Table 4 contains data that was processed with Microsoft Excel and analysed with PivotTable. According to the results of the investigation, the most productive author is Franciscus D. Suyatna, a lecturer at the University of Indonesia, who has 73 publications indexed by Scopus. The top ten authors are primarily lecturers from the University of Indonesia (6 persons). There are also Andree Kurniawan and Julius July from Pelita Harapan University, Rika Yuliwulandari from YARSI University, and

Retno Wahyuningsih from Indonesian Christian University. On the other hand, depending on the universities of lecturers, the University of Indonesia is also top, with a total of 810 articles (as shown in Table 6).

Table 5 shows the lecturers (writers) with the most citations from each cluster, for a total of ten. It can be seen that lecturers with fewer than 40 publications but a large number of citations occupy ranks 1 to 4. Apart from that, when it is related to collaboration in research, Djuardi Y is proof of the statement that the greater the collaboration, the greater the possibility of being cited.[30] Djuardi Y, with a total link strength of 166 (Table 3) and citations of 892 (Table 5). When sorted based on average citations, it can also be seen that most authors with high average citation numbers have a small number of articles (as shown in Table 5).

Limitations of the study

This study is limited to (1) the results of the publication of scientific works with the type of articles of lecturers in the Undergraduate Medical Study Programme located in DKI Jakarta and its surroundings, namely at the University of Indonesia, Syarif Hidayatullah State Islamic University, Jakarta Veteran National Development University, Indonesian Christian University, Indonesian Catholic University Atma Jaya, YARSI University, Jakarta Muhammadiyah University, Tarumanagara University, Pelita Harapan University, Trisakti University, and Gunadarma University, which are indexed by Scopus. (2) Lecturers found in a Scopus and/or Sinta database search (3) The results of the publication of scientific works taken in 1993 are marked as the earliest year of publication of lecturers' scientific works (articles) indexed in Scopus until 2022, (4) Search results for scientific publications in Scopus are limited using filters on author name (lecturer name), document type (article), and publication stage (final), and are produced by lecturers with the previously mentioned university affiliation listed.

Based on the results of the study, it can be concluded that the current trend of research topics in Scopus indexed scientific articles produced by lecturers of the Bachelor of Medicine Study Program in DKI Jakarta is Coronavirus disease 2019

with an average article publication in 2021. Collaborative relationships between 20 lecturers from each cluster are based on research interests, not based on one alma mater. Citation productivity and productivity in producing articles are different things, because there are differences in results. Lecturers with the most Scopus indexed articles do not mean they have high citations. The eleven universities in DKI Jakarta have not been productive enough in producing Scopus indexed articles. Therefore, research from medical lecturers still needs to be improved so that the results of research are more varied, so that students at the university also increase with new or developing knowledge and the responsibility of conducting research and development continues, and helps favor the university.

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Conflict of interests

The authors declare that they have no conflict of interest.

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