

Bibliometric Analysis and Visualization of Harm Reduction in Malaysia Indexed in Scopus

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ABSTRACT Introduction: This study aims to analyze the bibliometric characteristics and trends of articles on Harm Reduction in Malaysia, indexed by Scopus. **Methods:** Data taken from the Scopus database, articles searched in August 2021 with restrictions on Harm Reduction affiliation in Malaysia. The keywords used in this research are Harm Reduction and Malaysia. Simple statistical methods were used, and bibliometric analysis was performed using VOSviewer software. This study visualizes the patterns of keyword co-occurrence, document citations, co-citation relationships, and bibliographic coupling. **Results:** The number of study articles in the field of Harm Reduction has not increased significantly in recent years; articles on Harm Reduction have been published in 67 journals with 76 documents from 1995 to 2021. **Conclusion:** Research on Harm Reduction in Malaysia has not been of much interest, and in the last five years, there has been no significant increase. Therefore, the findings in this study can provide valuable data for future researchers to understand research trends and find research novelties in Harm Reduction in Malaysia.

Keywords: Bibliometric analysis, Harm Reduction, Malaysia, Scopus Database, VOSviewer.

Background

Harm Reduction (HR) program in Indonesia was initiated in 1999 [1] with financial assistance and support from international donor agencies that lead to policy or program implementation. Harm Reduction is a program to reduce the harm of narcotics for injecting drug users. In 2009, the World Health Organization (WHO), the United Nations Office on Drugs and Crime (UNODC), and the United Nations Program on HIV and AIDS (UNAIDS) issued guidelines for the 9-component Harm Reduction program, including:

1. Sterile Syringe Service

2. Opiate substitution therapy and other addiction recovery services

3. HIV counseling and testing

4. Antiretroviral therapy

5. Prevention and treatment of sexually transmitted infections

6. Condom program for injecting drug users and their sexual partners

7. Information communication and targeted education for injecting drug users

and sexual partner

8. Vaccination, diagnosis and treatment of hepatitis

9. Prevention, diagnosis and treatment of tuberculosis

From the 9 components of Harm Reduction mentioned above, Indonesia is still implementing these programs although currently there are 12 components of Harm Reduction. Research on Harm Reduction in Indonesia was first conducted in 1999 with an article document published on Scopus.

The purpose of this study was to determine the development of research on Harm Reduction or related causes and impacts in terms of the distribution of bibliometric maps and research trends in publications on the Scopus database using VOSViewer software. Bibliometrics can be said to be effective in providing research data that can be used for researchers to improve the quality of their research [2]. Research on Harm Reduction or related causes and impacts such as the use of narcotics, HIV, and AIDS in Indonesia for writers who write and publish articles on Scopus in its database from 1999 to 2021 with a total of 67 documents. Below are the Harm Reduction articles document or related each year from the Scopus database:

Table 1. Harm Reduction Articles Document

| Number | Year | Article document |
|--------------|----------|------------------|
| 1 | 1999 | 1 |
| 2 | 2002 | 1 |
| 3 | 2005 | 1 |
| 4 | 2006 | 1 |
| 5 | 2007 | 2 |
| 6 | 2008 | 2 |
| 7 | 2009 | 9 |
| 8 | 2010 | 2 |
| 9 | 2012 | 4 |
| 10 | 2013 | 2 |
| 11 | 2014 | 7 |
| 12 | 2015 | 4 |
| 13 | 2016 | 5 |
| 14 | 2017 | 2 |
| 15 | 2018 | 2 |
| 16 | 2019 | 10 |
| 17 | 2020 | 5 |
| 18 | 2021 | 1 |
| Total | - | 67 |

Source: Scopus database

From the table above, in the last five years from the Scopus database, research on Harm Reduction in Indonesia in 2019 has increased sharply with 10 published article documents. The current research is aimed at analyzing the bibliometric characteristics and trends of articles on Harm Reduction in Indonesia taken from the Scopus database. The findings of this study can provide useful data for future researchers to understand trends in research and to discover the novelty of their research in the field of Harm Reduction.

Literature Review

The bibliometric method was originally a study of library science and information science [3]. The bibliometric method has the ability and advantage to classify bibliographic materials from literature sources [4]. Several authors in journals have used bibliometrics for article writing analysis tools [5] such as articles on measuring journal impact [6], articles on university rankings [7]; [8], articles on scientific communication [9], and other articles. Bibliometric methods have been used in various sciences or other research fields, such as tourism [10]; [11]; [12], innovation [13], and business [14], until now there has been no bibliometric research related to the field of Harm Reduction in Indonesia.

Methods

In this study all articles analyzed in the study were taken from the Scopus database, where Scopus is one of the most comprehensive journal databases in the world and can provide scientific academic information [15]. This study uses VOSviewer affiliate analysis to visualize and analyze trends in the form of bibliometric maps [16]. VOSviewer can also create publication maps, country maps, or journal maps based on shared citation networks or create keyword maps based on their networks [17].

In this study, all data were taken from the Scopus database in August 2021. The results were filtered by determining the Harm Reduction analysis in Indonesia. The first step is to determine the keywords to use in the research by including all aspects of Harm Reduction, this study uses separate keywords such as "Harm

Reduction and Indonesia.” After completing the keywords, the next step is to search for articles from the Scopus database. Search was limited to journal articles and conferences on Harm Reduction and Indonesia. Then the next step is to refine the initial results by excluding duplicate documents, leading to identification of the relevant documents. The last process is data analysis carried out using VOSviewer software to analyze and visualize articles.

Results

Based on data obtained from the Scopus database, articles on Harm Reduction in Indonesia published by Scopus first appeared in 1999 with one article document. However, in the last five years the number of papers written by authors and published in journals has fluctuated, a significant increase only in 2019 with 10 article documents. From 1999 to 2021, there were 67 documents spread across 41 Scopus indexed journals. Below is the distribution of articles in several journals indexed by Scopus:

Table 2. Document articles in Scopus

| Number | Journal Name | Publish Year |
|--------|---|------------------|
| 1 | International Journal of | 2021 |
| 2 | Disaster Risk Reduction 59, | 2020 |
| 3 | 102194 | 2020 |
| 4 | Journal of Cleaner Production 277, 124045 | 2020 |
| 5 | Studies in Family Planning 51 | 2020 |
| 6 | (4), pp. 295-308 | 2020, |
| | IOP Conference Series: Earth and Environmental Science 520 (1), 012012 | 2020, |
| 7 | | 2016 |
| 8 | The Lancet Psychiatry 7 (3), | 2019, |
| 9 | pp. e11 | 2015, |
| 10 | International Journal of Prisoner Health 17 (2), pp. 156-170; 12 (1), pp. 27-38; 5 (4), pp. 180-191 | 2013, 2012, 2009 |
| 11 | | 2019 |
| 12 | Harm Reduction Journal 16 | 2019 |
| 13 | (1), 67; 12 (1), 32; 10 (1), 13; | 2019 |
| 14 | 9,37; 6,28 | 2019 |
| 15 | Reproductive Health 16 (1), 158 | 2019 |
| | Cochrane Database of Systematic Reviews 2019 (10), CD009902 | 2019, 2016 |
| 16 | | 2016 |
| 17 | 2019 IEEE Global | 2019 |

| | | |
|----|---|-------|
| 18 | Humanitarian Technology | |
| 19 | Conference, GHTC 2019 | 2019, |
| 20 | 9033084 | 2015, |
| | Proceedings of 2019 4th | 2015, |
| 21 | International Conference on | 2014, |
| 22 | Informatics and Computing, | 2014, |
| 23 | ICIC 2019 8985803 | 2009, |
| 24 | Ethics and Human Research | 2009, |
| 25 | 41 (5), pp. 28-34 | 2006, |
| 26 | PLoS ONE 14 (8), e0221078; | 1999 |
| | 14 (1), e0209278; 11 | |
| 27 | (11),e0164699 | 2018 |
| 28 | Journal of Advanced | 2018 |
| 29 | Research in Fluid Mechanics | 2017 |
| 30 | and Thermal Sciences 54 (1), pp. 95-101 | 2016, |
| | International Journal of Drug | 2005 |
| 31 | Policy 63, pp. 1-11; 26 (12), | |
| 32 | pp. 1244-1250; 25 (4), pp. | 2016 |
| 33 | 755-761; 25 (4), pp. 749-754; | 2016 |
| 34 | 25 (4), pp. 789-797; 20 (3), | 2015 |
| 35 | pp. 237-243; 20 (3), pp. 283- | 2015 |
| 36 | 291; 17(1), pp. 35-40; 10 (2), | 2014 |
| | pp. 109-116 | 2014 |
| 37 | Frontiers in Forests and | |
| 38 | Global Change 1,10 | 2014 |
| 39 | AIDS and Behavior 22 (10), | 2014 |
| | pp. 3307-3323 | 2013 |
| 40 | Journal of Travel Medicine 24 | 2012 |
| 41 | (6), tax068 | |
| | Post-2020 Climate Action: | 2012 |
| | Global and Asian | 2012 |
| | Perspectives, pp. 125-142 | 2010 |
| | American Journal of Public | 2010 |
| | Health 106 (11), pp. 2071- | 2009 |
| | 2075; 95 (12), pp. 2120 | 2009, |
| | Environmental Research | 2009, |
| | Letters 11 (1),014006 | 2009, |
| | The Lancet Gastroenterology | 2009 |
| | and Hepatology 1 (3), pp. | 2008 |
| | 248-255 | 2008 |
| | Journal of Acquired Immune | 2007 |
| | Deficiency Syndromes 69, pp. | |
| | S155-S161 | 2007 |
| | Journal of Viral Hepatitis 22, | 2002 |
| | pp. 42-65 | |
| | SAGE Open 4 (1) | |
| | American Journal of Tropical | |
| | Medicine and Hygiene 91 (6), | |
| | pp. 1079-1087 | |
| | Science (New York, N.Y.) | |
| | 345(6193), pp. 162-163 | |
| | Science 345 (6193), pp. 152- | |
| | 155 | |
| | Reproductive Health Matters | |
| | 21 (41), pp. 214-224 | |
| | Collective action and property | |
| | rights for poverty reduction: | |
| | Insights from Africa and | |

Asia, pp. 359-392
 The Lancet 379 (9814), pp. e28-e30
 Drug and Alcohol Review 31 (1), pp. 95-100
 The Role of Forests in Carbon Capture and Climate Change, pp. 43-52
 Wildlife Research 37 (5), pp. 418-427
 AIDS 23 (11), pp. 1405-1413
 Acta medica Indonesiana 41 Suppl 1, pp. 38-44; 41 Suppl 1, pp. 52-56; 41 Suppl 1, pp. 75-78; 41 Suppl 1, pp. 65-69
 Geography and Drug Addiction, pp. 243-254
 Tobacco Control 17 (6), pp. 372-378
 HIV/AIDS policy & law review/Canadian HIV/AIDS Legal Network, 12 (1), pp. 36-38
 Acta Horticulturae 742, pp. 163-168
 Bulletin on Narcotics 54 (1-2), pp. 103-116

Source: Scopus database

The next step is to visualize the data on Harm Reduction articles in Indonesia in terms of countries related to co-authoring, in terms of organization, author keywords related to the co-occurrence, publication sources related to citations from journals most frequently cited or cited by the authors, and combining bibliography. The first visualization is co-authorship related to the state. The purpose of the co-authoring analysis is to determine the level of communication and influence between countries in writing articles on Harm Reduction in Indonesia. Each country has a minimum of 5 documents consisting of 48 countries, resulting in 6 selected countries, namely: Indonesia, United Kingdom, Australia, United States, South Africa, and Netherland. The countries that have been mentioned are the countries with the most citations, below is the citation table seen from the country network:

Table 3. Countries that are mostly cited

| Country | Documents | Citations |
|----------------|-----------|-----------|
| Indonesia | 33 | 336 |
| United Kingdom | 12 | 161 |

| | | |
|---------------|----|-----|
| Australia | 11 | 190 |
| United States | 15 | 270 |
| South Africa | 5 | 73 |
| Netherland | 7 | 76 |

Source: Scopus database

The table above shows the number of documents and the large number of citations on Harm Reduction articles or related ones from Indonesia, because that country is being researched. Furthermore, it can be seen from the distribution map of the co-author's country network which will be shown in Figure 1 below:



Figure 1. Article co-authoring network by country

The first visualization can be seen in Figure 1 is the co-authorship associated with the country. The purpose of the co-authoring analysis is to determine the level of communication and influence between countries in writing articles on Harm Reduction in Indonesia. From the results of the VOSviewer network of co-authoring articles in terms of countries, there are 2 clusters: cluster 1 consists of Australia, Indonesia, the Netherlands, and the United States, and cluster 2 consists of South Africa and the United Kingdom.

Links between nodes indicate the relationship between countries, and the link thickness and distance between nodes indicates the degree of collaboration between countries. As shown in Figure 1, the center of the network is Indonesia, because articles written about Harm Reduction are in Indonesia. While visualization of co-authorship related to authors found 281 authors with a minimum of 2 documents and a maximum of 25 documents, 11 threshold documents that had 11 authors selected.

Table 4: Number of author's documents that are widely cited

| Author's name | Documents | Citations |
|----------------|-----------|-----------|
| Alisjahbana b. | 3 | 27 |
| Hymans t.d | 3 | 35 |
| Hardon a. | 2 | 26 |
| Idrus n.i | 2 | 27 |
| Van der ven a. | 2 | 14 |
| Cluver l.d | 2 | 10 |
| Stoicescu c. | 2 | 10 |
| Van crevel r. | 2 | 5 |
| Aditama t.y | 2 | 22 |
| Beyrer c. | 2 | 17 |
| Nasir s. | 2 | 27 |

Source: Scopus database

The table above shows the authors who have many documents and the number of authors cited. Next is a picture of a network of writing with articles about Harm Reduction in Indonesia in terms of authors, and can be seen in Figure 2 below:



Figure 2. Co-authoring network of Harm Reduction articles in terms of authors

From Figure 2 above, the results of the bibliometric analysis only found 2 clusters, the green network consists of the author Van der ven a. and Van crevel r., then the red tissue is Alisjahbana b. and Aditama t.y. Then, VOSviewer will analyze the network of authors' organization names, with the aim of seeing which organization writes most of Harm Reduction in Indonesia. The results of VOSviewer get 213 organizations that have at least 1 document per organization. Below is a picture of the Harm Reduction article co-authoring network in terms of organization:

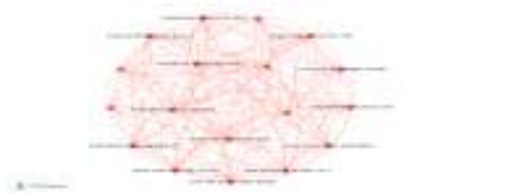


Figure 3. Co-authoring network of Harm Reduction articles in terms of organization

From Figure 3 above, the results of the bibliometric analysis found 213 organizations with one document for each organization that were gathered in one cluster to communicate with each other to write and publish their articles on Scopus. Furthermore, the distribution map for keywords in the Harm Reduction article will be presented with VOSviewer analysis. The results of the VOSviewer analysis get 954 keywords, then filtered using a minimum of 4 keyword appearances, 71 keywords meet the threshold. The keyword "Human" was the most common 43 occurrences followed by "Indonesia" 42 occurrences, "Harm Reduction" 31 occurrences, "HIV" 21 occurrences. Below is an image of the keyword network, it can be seen in Figure 4:

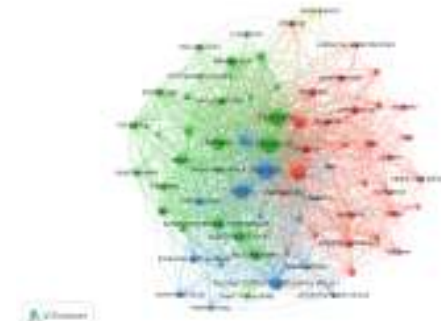


Figure 4. Keyword co-occurrence network in Harm Reduction articles

The size of the nodes and keywords in Figure 4 represents the weight of each keyword with a larger size indicating a greater weight. From Figure 4 above, the distance between nodes reflects the strength of the relationship between these nodes. A shorter range indicates a stronger connection. Links between two keywords indicate that they occur together, while link thickness indicates the density of co-occurrence. Nodes with the same color belong to a cluster. As shown in figure 4, the "Human" node has thick lines connecting it to Indonesia, Harm Reduction, and HIV.

Next is the visualization of excerpts from articles about Harm Reduction which are seen from the source of document citations based on

VOSviewer, there are 61 document sources. However, when a filter is applied to sources with at least one document it results in 51 documents meeting the threshold and VOSviewer splits them into 3 clusters. Of the 51 documents that meet the threshold, only 4 documents have a strong connection with each other, as shown in Figure 5:



Figure 5. Network of Harm Reduction article citations from the source of citation documents

The color of the nodes of figure 5 corresponds to the separate clusters defined, the size of the nodes indicates the number of citations received by the source. The thickness of the link and the distance of the nodes indicate the closeness and strength of the relationship between the nodes. Thicker nodes and closer distances indicate more frequent and stronger relationships. As shown in Figure 5 above. From the VOSviewer results obtained for the journals most frequently cited or cited by the authors, there are 3 journal sources:

Table 5: Journals that are frequently cited and quoted

| Journal Source | Documents | Citations |
|--------------------------------------|-----------|-----------|
| Harm Reduction Journal | 5 | 91 |
| International Journal of Drug Policy | 9 | 145 |
| Acta Medica Indonesiana | 4 | 27 |

Source: Scopus database

From the table above, it can be seen the journals that are often quoted and cited, as written in Figure 6 below:



Figure 6. Harm Reduction journal network in terms of document citation sources

Then, based on the results of VOSviewer in bibliographic coupling-articles, it found 61 documents with at least one document, and found 51 thresholds. The author who has been widely cited in the first place is Fridman s.r. (2009) cited 68 times, Sherman p. (2016) as many as 63 times cited in the second place, and then the third place was followed by the author Sharma m. (2009) as many as 54 times cited. The article-coupling bibliographic network can be seen in Figure 7:

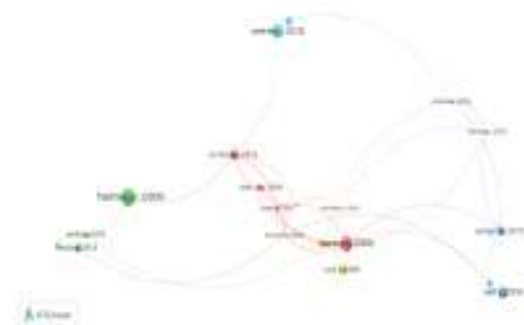


Figure 7. The bibliographic network-harm reduction article document coupling

From Figure 7 above. The distance between the two nodes represents the closeness of the relationship between the two researchers. From these results found the authors who are divided into 6 clusters:

Cluster 1:

- Davis s.l.m. (2009)
- Morineau g. (2012)
- Pisani e. (2006)
- Sawitri a.a.s. (2016)
- Sharma m. (2009)
- Thomson n. (2009)

Cluster 2:

- Friedman s.r. (2009)
- Hardon a. (2014)

- Hardon a.p. (2014)

Cluster 3:

- Springer s.a. (2015)
- Stone k.a (2015)
- Wait s. (2016)

Cluster 4:

- Komalasari r. (2020)
- Nasir s. (2009)
- Spooner c. (2015)

Cluster 5:

- Stoicescu c. (2018)
- Stoicescu c. (2019)

Cluster 6:

- Iyu s.y. (2012)
- Petersen z. (2013)

From the clusters above, the authors quote each other, in other words, writers who are close to each other tend to quote the same article, as shown in Figure 7.

Discussion

The results above show detailed bibliographic characteristics of articles from 1999 to 2021 in 41 Scopus indexed journals with a total of 67 documents. Research on Harm Reduction in Indonesia in the last five years has only one significant increase, namely in 2019 with 10 article documents. This shows that international publications of research on Harm Reduction in Indonesia are not yet developed and there are not many interested people. Although based on the journal in which the article was published, it appears that research on Harm Reduction has been widely accepted by the scientific community around the world, it can be seen in the database of 41 journals indexed by Scopus.

VOSviewer analysis shows the authors have relationships with researchers from more than 48 countries. This means that Indonesian writers are also active in collaborating with researchers or writers from other countries. In addition, writers who write about Harm Reduction in Indonesia consist of various organizations. In co-occurrence analysis regarding keywords shows the patterns and relationships between keywords that appear together in an article.

These keyword patterns make it easier for researchers to identify patterns in Harm Reduction research in Indonesia. As mentioned earlier, the focus of recent research is Harm Reduction in Indonesia. Therefore, as shown in Figure 4 there is a wide scope for research on Harm Reduction and HIV for future research or further research. Figures 2 and 5 show that there is no direct correlation between the number of publications in a particular journal and the number of citations. Furthermore, the bibliography related to the coupling document shows the closeness and pattern of influence between the articles, therefore the authors quote articles on Harm Reduction, either the causes or effects related to Harm Reduction.

Conclusion

Statistical results show that the number of articles on Harm Reduction in Malaysia published in Scopus indexed journals is still not very interested or in other words not many authors or researchers have researched and discussed it, especially in the last five years. Furthermore, the results of the study show that the authors have very open opportunities to collaborate with researchers or writers from other countries. Regarding Harm Reduction in Indonesia, not many have done research. In addition, the results of the study indicate that research sources on Harm Reduction in Indonesia are still widely available and accessible for further research in the future.

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Availability of data and materials

The datasets used and or analyzed during the current study are not publicly available for reasons of individual anonymity, but are available from the relevant authors upon reasonable request.

Ethical approval and consent to participate

All respondents signed an informed consent referring to their participation in the study.

Consent for publication

The organization responsible for the program described in this paper signed a consent form.

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