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Computing Bibliometric Analysis with Mapping Visualization using VOSviewer on "Pharmacy" and "Special Needs" Research Data in 2017-2021

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ABSTRACTS

Using mapping analysis using VOSviewer, this study intends to investigate the development and interrelationships between terminology in "pharmacy" and "special needs" research. The study data was gathered using the Publish or Perish 7 tool from the Google Scholar database for the period 2017-2021. The keyword "pharmacy" and "special needs" was used to collect information. The data search yielded 1000 items that were thought to be relevant. With a total of 222 papers, the results showed that "pharmacy" and "special needs" research were quite popular in 2019. In the years 2019-2021, research on pharmacy and special needs was on the decline. The word "pharmacy" and "special needs" are related with five key terms that have the highest total link strength, according to the mapping analysis conducted using the VOSviewer tool, namely school, pharmacy education, special needs, patient, and student. The term student is frequently connected with "pharmacy" and "special needs" research, specifically link strength 603. This study can be utilized to help determine a research issue or topic for a research discussion in the field of "pharmacy" and "special needs".

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1. INTRODUCTION

Bibliometric analysis is based on relevant information about scientific publications/literature (Zhu & Guan, 2013). The goal of bibliometrics is to count and analyze the various aspects of communication to describe the process of written communication as well as the type and direction of development. Bibliometric analysis is mostly done in popular studies (Aksu & Güzellerii, 2019). Bibliometric analysis to aid academics in examining bibliographic material, as well as citation analysis for each item.

Currently, a lot of research has been done on bibliometric analysis of a publication using VOSviewer, including Digital learning (Al Husaeni & Nandiyanto, 2022), computer science (Al Husaeni & Nandiyanto, 2023a), vocational schools (Al Husaeni & Nandiyanto, 2023b), high school (Al Husaeni & Nandiyanto, 2023c), covid-19 research (Hamidah *et al*., 2020), scientific publications (Mulyawati & Ramadhan, 2021), chemical engineering (Nandiyanto *et al*), materials research (Nandiyanto & Al Husaeni, 2021), special needs education (Al Husaeni *et al*., 2023a), techno-economic education publications (Ragadhita & Nandiyanto, 2022), machine performance (Setiyo *et al*., 2021), datasets describing a decline in the number of scientific publications (Nandiyanto *et al*., 2020a), applications in robotic hand systems (Castiblanco *et al*., 2021), research effectiveness in the field of study among high-end universities (Nandiyanto *et al*., 2020b), educational research (Al Husaeni *et al*., 2023b), bioenergy management (Soegoto *et al*., 2022), magnetite nanoparticles (Nugraha, 2022), nanocrystalline cellulose production research (Fauziah, 2022), metals nano-organic framework synthesis (Shidiq, 2023), titanium dioxide nanoparticle synthesis (Nugraha & Nandiyanto, 2022), nanocrystalline cellulose (Maulidah & Nandiyanto, 2022), carbon nanotubes (Aldhafi & Nandiyanto, 2021), nano-sized agricultural waste brake pads (Deni & Nandiyanto, 2022). However, from the many studies on bibliometrics, there has been no research that has conducted bibliometric analysis on “pharmacy” and “special needs” research using the VOSviewer. Therefore, this study was conducted to conduct a bibliometric analysis of research in the field of “pharmacy” and “special needs” through computing mapping visualization using VOSviewer. This research is expected to be used as a reference or the first step in determining the related research topic.

2. METHODS

On a data set of articles published in a Google Scholar indexed journal from 2017 to 2021, this study employs a computational mapping analysis method. We use the Publish or Perish 7 reference manager tool to get data from the research. All of the data was collected in February 2022. The keyword “pharmacy” and “special needs” was used to conduct a data search. In a recent study, we provided detailed instructions for installing and utilizing the tools (Google Scholar and Publish or Perish 7) as well as a step-by-step procedure for acquiring data (Al Husaeni & Nandiyanto, 2022).

This study involves multiple stages, including (i) identifying the research topic, (ii) collecting publishing data using Publish or Perish 7, and (iii) processing the bibliometric data of the articles received using the Microsoft Excel application to obtain article data for this study. (iv) analysis of mapping analysis results, and (v) visualization of publishing data mapping using the VOSviewer application. Network visualization, density visualization, and overlay visualization based on the relationship between existing items are three forms of visualization of mapping text data and article bibliometric data. 6920 words were discovered by data mapping based on text data. The terms discovered are re-ordered according to a set of rules, one of which is that a term must appear at least 10 times. As a result, the number of phrases chosen in the

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initial provisions is 162. The mapping analysis method is then performed on 60% of the relevant phrases. As a result, there are 97 terms used.

3. RESULTS AND DISCUSSION

3.1. Development of Research in the Field of "pharmacy" and "special needs"

Figure 1 depicts the frequency of research with the keywords of "pharmacy" and "special needs" in the form of a diagram. The graph depicts the fluctuation of publications for the research "pharmacy" and "special needs"." The year 2019 saw the most publications on the topic of "pharmacy" and "special needs", with 222 articles. In 2017, there were the least amount of research on the topic of "pharmacy" and "special needs". Publications on "pharmacy" and "special needs" increased from 2017 to 2019. Meanwhile, research on pharmacy and special needs has dropped from 2019 to 2021.

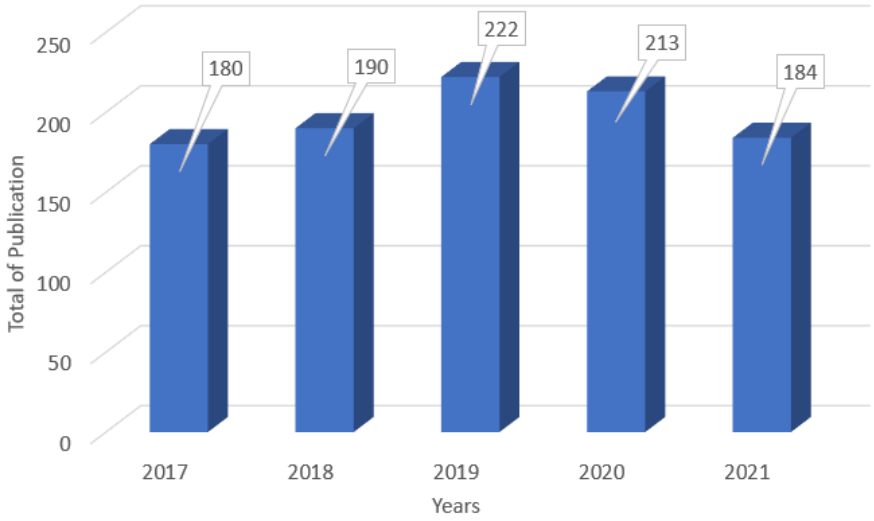

Figure 1. Developmental level of research on "pharmacy" and "special needs".

3.2. VOSviewer Mapping Result Cluster with Keyword "pharmacy" and "special needs"

The minimum number of relationships between terms in VOSviewer is set at least two. Six clusters were discovered based on the results of mapping using VOSviewer and the statement "pharmacy" and "special needs"." Each cluster has a distinct color that indicates the cluster's kind. Each cluster is made up of various sized circles (Al Husaeni & Nandiyanto, 2022). The size of the circle is determined by frequency. The broader the circle becomes as the word is used more frequently in studies (Al Husaeni & Nandiyanto, 2022).

The explanation of the four clusters is as follows:

(i) Cluster 1 has 31 items marked in red that is access, case, clinical pharmacy service, community pharmacy, contribution, country, covid, drug, effect, field, goal, guideline, health care, hospital, hospital pharmacy, life, management, medication, pandemic, patient, pharmacy department, pharmacy service, qualitative study, quality, recommendation, Saudia Arabia, service, special attention, systematic review, and treatment.

(ii) Cluster 2 has 26 items which are marked in green that are ability, academic pharmacy, action, activity, American association, association, college, colleges, curriculum, faculty, health care need, member, paper, pharmacy graduate, pharmacy profession, pharmacy staff, pharmacy technician, preceptor, profession, relationship, report, responsibility, school, society, and university.

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(iii) Cluster 3 has 19 items marked in blue that is accreditation council, competency, course, doctor, faculty member, framework, pharmacy curriculum, pharmacy education, pharmacy educator, pharmacy practice experience, pharmacy program, pharmacy school, PharmD, skill, standard, student, and teaching.
(iv) Cluster 4 has 17 items marked in yellow that is the attitude, awareness, child, community pharmacist, data, family, health need, individual, lack, nurse, parent, participant, person, population, risk, special need, and type.
(v) Cluster 5 has 3 items marked in purple that is pharmacy resident, student pharmacist, and transition.
(vi) Cluster 6 has 1 item marked in cyan which is nursing.

From the cluster data, we can see that there are several items related to research in the field of "pharmacy" and "special needs". Of the items listed in the cluster, three clusters have the greatest total link strength, namely student, special need, and patient. The term student is connected to other terms as shown in **Figure 2**.

Based on **Figure 2**, the term student relates to school, college, nursing, special need, patient, pharmacy education, activity, teaching, pharmacy school, and several other terms that are seen. The special need term is connected to other terms, including child, family, parent, drug, nurse, access, life, lack, population, management, medicine, case, person, data, risk, special attention, medication, treatment, hospital, service, community, pandemic, attitude, and so on as shown in **Figure 3**. And the last term is the patient term. Not much different from the term student and special need, the patient term is also connected to several other terms including special need, parent, service, awareness, data, type, person, population, covid, pandemic, and so on as shown in **Figure 4**.

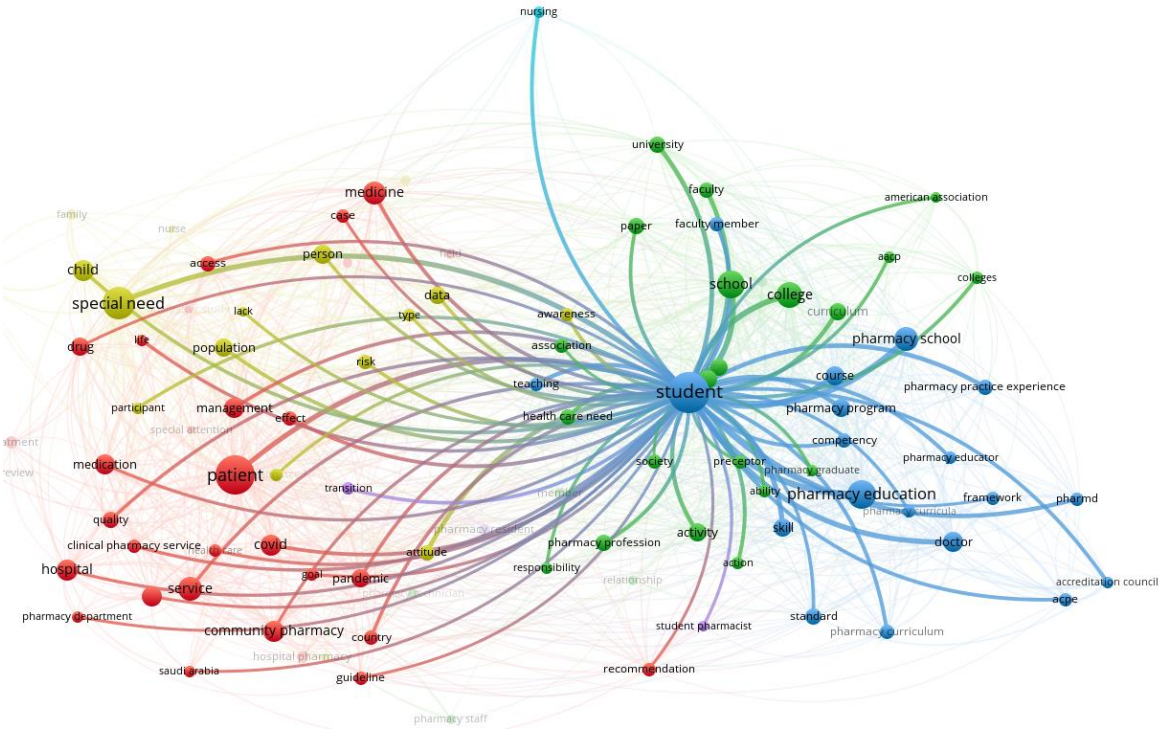

Figure 2. Network visualization of student term.

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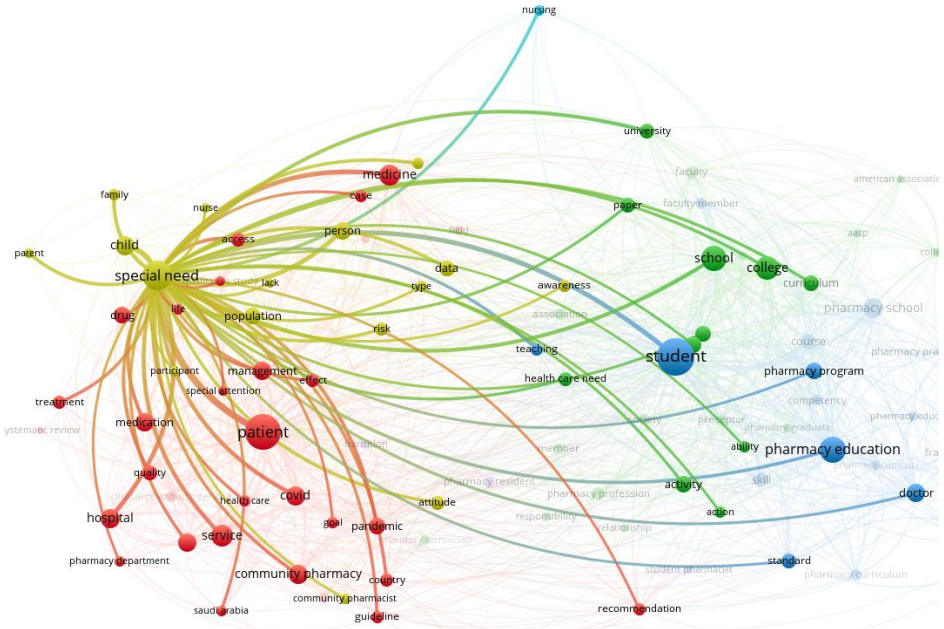

Figure 3. Network Visualization of Special Need term.

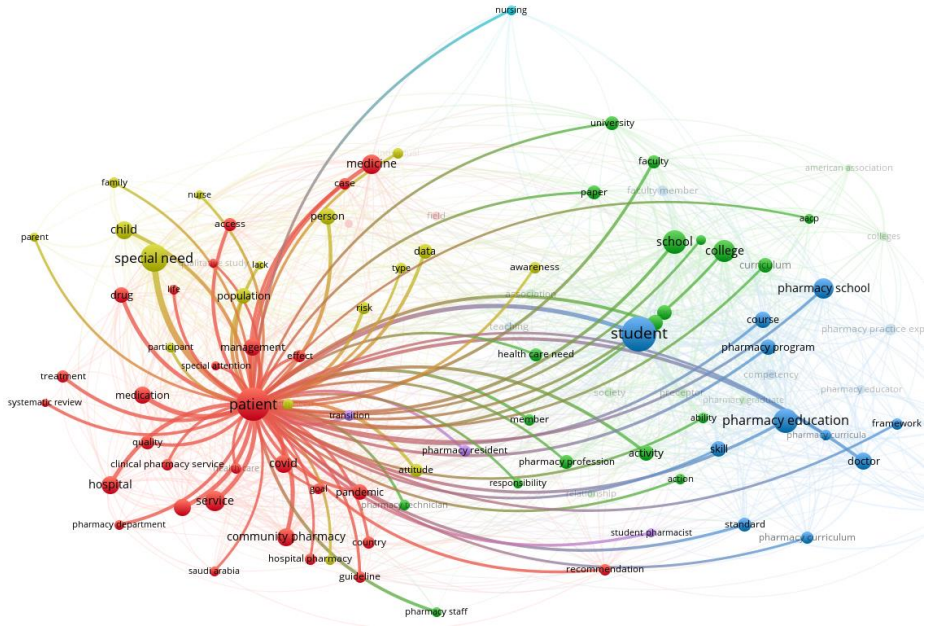

Figure 4. Network Visualization of Patient term.

3.3. Mapping Visualization "pharmacy" and "special needs" Research using VOSviewer

VOSviewer supports three types of visualization, namely network visualization, density visualization, and overlay visualization [3]. Network visualization in "pharmacy" and "special needs" research is shown in **Figure 5**. Network visualization shows terms that are often used in "pharmacy" and "special needs" research.

Figure 6 shows the main terms in the field of "pharmacy" and "special needs" research. **Figure 6** shows 6 main terms, namely school, pharmacy education, special need, patient, and student. School terms have 330 total link strength. Pharmacy Education term has 332 total link strength. The Special Needs term has 412 total link strengths. Patient terms have 517 total link strength. Student terms have 603 total link strength. The student term has the highest total link strength, this indicates that the term student is the most widely associated

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and used in “pharmacy” and “special needs” research. The school term has the least total link strength, which is 330 total link strength, this shows the opposite of the student term.

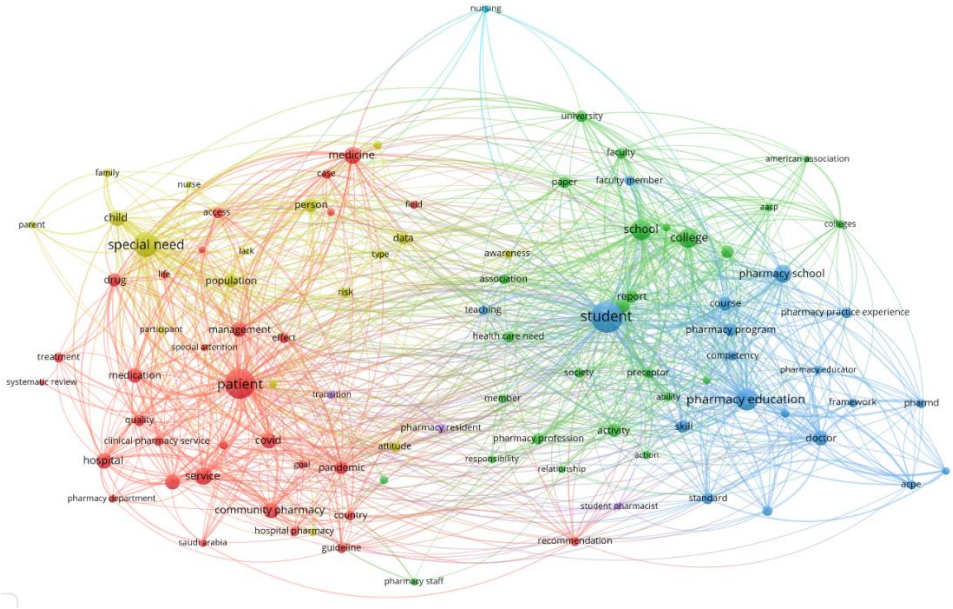

Figure 5. Network Visualization of “pharmacy” and “special needs” Research.

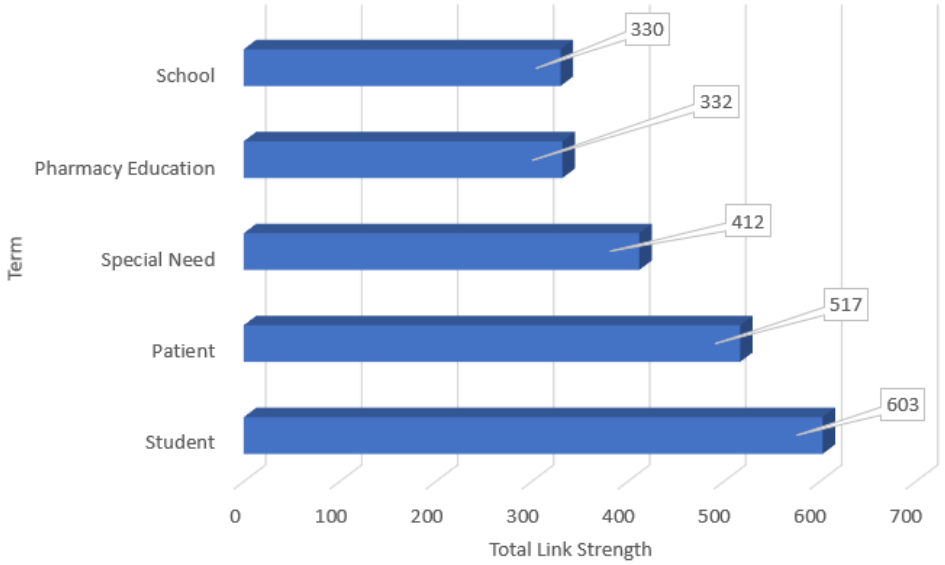

Figure 6. The main term in the field of “pharmacy” and “special needs” research.

4. CONCLUSION

For the period 2017-2021, the Publish or Perish 7 application is utilized to collect data from the Google Scholar database. Data was gathered using the keywords “pharmacy” and “special needs”." A data search turned up 1000 items that were judged relevant. The research findings suggest that “pharmacy” and “special needs” research is highly popular in 2019, with a total of 222 papers. There is a decrease in research on pharmacy and special needs from 2019 to 2021. According to a mapping analysis conducted using the VOSviewer tool, the word “pharmacy” and “special needs” is linked to five important terms in each cluster: school, pharmacy education, special needs, patient, and student. With a total connection strength of 603, the term "student" is commonly related to “pharmacy” and “special needs” studies.

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5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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