


## Pressure Injuries in Different Disciplines: A Bibliometric Analysis / Farklı Disiplinlerde Basınç Yaralanması: Bir Bibliyometrik Analiz

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### Öz

**Giriş:** Gelişen sağlık teknolojileri ve birçok koruyucu yaklaşıma rağmen, basınç yaralanmaları sağlık profesyonelleri ve sağlık maliyetleri için güncel sağlık sorunları arasında yer almaya devam etmektedir. **Amaç:** Bu çalışma, basınç yaralanmaları ile ilgili farklı disiplinlerdeki yazar, dergi ve atıf sayısı gibi çalışmaların özelliklerini incelemek ve daha sonraki çalışmalara bir bakış açısı sağlamak amacıyla yapılmıştır. **Gereç ve Yöntemler:** Araştırmanın analizinde bibliyometrik analiz yöntemi, MS-Excel programı ve Vosviwer programı kullanılmıştır. Veri tabanı “basınç ülseri”, “basınç yarası”, basınç yaralanmaları”, “yatak yarası”, “basınç yaraları”, “dekübit ülseri” ve “dekübitus” anahtar kelimeleri kullanılarak arandı. **Bulgular:** Çalışma kriterleri için toplam 4224 araştırma makalesi, kitap bölümü ve inceleme çalışmaları analiz edildi. Araştırma sonuçlarına göre ilk makalenin 1949 yılında yayınlandığı, en fazla çalışmanın 2021 yılında yapıldığı, çalışmaların %87,2'sinin hemşirelik, %13,3'ünün ise Journal of Wound Care dergisinde yayınlandığı belirlendi. Yayınların %87,9'unun İngilizce ve %26,7'sinin Amerika Birleşik Devletleri'nde yapıldığı saptandı. Ülkelerin yayın sayıları ile gayri safi milli hasılatları arasında pozitif ve anlamlı bir ilişki olduğu saptandı ( $r=0,774$ ,  $p<0,009$ ). **Sonuç ve Öneriler:** Araştırma sonucuna dayanarak yıllar içinde basınç yaralanması ile ilgili çalışmaların artmasına rağmen yazar işbirliğinde azalma olduğu, çalışmaların ağırlıklı olarak hemşirelik alanında yapıldığı ve ilgili dergilerde yayınlandığı, ayrıca multidisipliner yaklaşım eksikliğinin olduğu sonucuna varıldı. Bu araştırma, yeni araştırmacılara konuya yönelik çalışmalarda, hangi anahtar kelimeleri kullanabilecekleri, hangi yazarların makalelerini inceleyebilecekleri konusunda yol gösterici olabileceği düşünülmektedir. Araştırma sonuçlarına dayanarak, basınç yaralanmasının önlenmesi için disiplinler arası işbirliğinin teşvik edilmesi önerilmektedir.

*Anahtar Kelimeler: Bibliyometrik analiz, Bası yarası, Veritabanı*

### Abstract

**Introduction:** Despite developing health technologies and many preventive approaches, pressure injuries are still among the current health problems for health professionals and health costs. **Aim:** This study was conducted to examine the features of the studies on pressure injuries in different disciplines like authors, journals, and the number of citations and provide a perspective for further studies. **Material and Methods:** The study used the bibliometric analysis method, MS Excel program, and Vosviwer. The data were searched using the keywords “pressure ulcer”, “pressure wound”, pressure injuries”, bed sore”, “pressure sores”, “decubitus ulcer”, and “decubitus” **Results:** A total of 4224 research articles, book chapters, and review articles were analyzed for the study criteria. The results showed that the first article was published in 1949, the highest number of studies was done in 2021, 87.2% of the studies were nursing, and 13.3% were published in the Journal of Wound Care. 87.9% of the studies were published in English, and 26.7% were published in the United States of America. It was determined that there was a positive relationship between the number of publications and the gross national product of the



countries ( $r=0.774$ ,  $p<0.009$ ). Conclusion and suggestions: It was concluded that despite the increasing number of studies on pressure injury over the years, there was a decrease in author collaboration, the studies were primarily conducted in nursing and published in relevant journals, and there was a lack of a multidisciplinary approach. With this research, new researchers will be asked research to be conducted on the subject when researching pressure injury, it provides researchers with which keywords they can use, which authors' articles they can review, and collaborative research by the authors. Based on the research results, encouraging interdisciplinary collaboration and interdisciplinary cooperation is recommended for pressure injury prevention.

*Keywords: Bibliometric Analysis, Pressure sore, database*

## 1. Introduction

Pressure injury (PI) is defined as an injury caused by external factors such as pressure, shearing, friction force, and patient-related factors such as age and gender in the tissue under the bony prominence. (Machado et al., 2022). It is reported that factors such as pressure, humidity, friction, tearing, immobilization, lack of activity, impairment in sensory perception, nutrition, oxygenation, and skin temperature may be effective in the development of PI, especially in patients with impaired mobility (Bostan, Worsley, Abbas, & Bader, 2019; Coleman et al., 2013a) Although terms such as bedsore, decubitus ulcer, decubitus, pressure sore, pressure injury are used interchangeably in the literature, the most common expression is "pressure injury" as it develops due to pressure (Akyüz & Alkan, 2022). Although it is a preventable health problem, the treatment of PI is time-consuming and costly, and prolonged care leads to prolonged hospitalization and thus significant complications like infection and pain (Minteer et al., 2020). A pressure injury can negatively affect the patient's physical and psychological health due to social isolation (6). Incidence and prevalence studies on pressure injury provide important information on the development of PI and are considered to be an indicator of the quality of medical and nursing care (7). Systematic presentation of research or studies on a specific topic or field can be a guide for other researchers. In addition to studies such as systematic reviews and meta-analyses, it is emphasized that bibliometric analysis is an innovative method that can be preferred for comprehensive and complex systematic reviews (Seyran, 2020). In this context, many studies were conducted on PI, including different disciplines, and this present research aimed to provide a different perspective for other future research using the bibliometric analysis method.

## 2. Material and Methods

Bibliometric analysis is a research method used in library and information science to evaluate previous, current, and future research trends of authors, journals, and institutions on a particular topic, and to identify the most productive journals by examining publication patterns. Therefore, in this study, the bibliometric method was used for the analytical analysis of the PI issue. The data were obtained by searching the Elsevier SCOPUS database (<https://www.scopus.com/search/form.uri?display=basic#basic>) of the xxx University online library. A total of 27,596 studies were accessed in the SCOPUS database and searched by the keywords determined for pressure injury. After certain filters were added, 4809 studies published in peer-reviewed journals including specific disciplines (Nursing, Engineering, Materials Science, Health Professionals, Social Sciences, Multidisciplinary Research, Computer Science, and Psychology) were reached. The Medical Subject Heading (MeSH) database was first searched using the pressure sore keyword. The results were determined as "pressure sore", "pressure sore", "bed sore", "pressure sore", "pressure sore", "decubitus" and "decubitus ulcer". In the SCOPUS database search engine, using only the "and" bool operator, a search was done with all the keywords related to the topic in MESH, and the investigation was started for this search result. Only original articles, reviews, and book chapters were included in the study by



filtering the SCOPUS database—no country or language filtering was applied. Since the SCOPUS database is up-to-date and the research flow is considered, a single-day search was made on 02.06.2022. VOSviewer (Version 1.6.16, Leiden University Center for Science and Technology Studies, The Netherlands) package program was used to create network visualizations such as keyword density, keyword collaboration, author collaboration and co-citations of authors.

## **2.1. Type of study**

In the research, a scanning model, which is one of the descriptive methods, was used.

## **2.2. Place / Time of study**

The data were obtained by searching the Elsevier SCOPUS database (<https://www.scopus.com/search/form.uri?display=basic#basic>) of the Giresun University online library.

## **2.3. Sample of Study**

The population, sampling, and sampling methods were not used. A database scan was done.

## **2.4. Data Collection Tools**

MS office excel program was used as data collection tool

## **2.5. Collection of data**

The data were obtained by searching the Elsevier SCOPUS database (<https://www.scopus.com/search/form.uri?display=basic#basic>) of the XXX University online library. This research is limited to research articles and keywords published before 04.12.2022 in the SCOPUS database. The Medical Subject Heading (MeSH) database was first searched using the pressure sore keyword. The results were determined as "pressure sore", "pressure sore", "bed sore", "pressure sore", "pressure sore", "decubitus" and "decubitus ulcer". In the SCOPUS database search engine, using only the "and" bool operator, a search was done with all the keywords related to the topic in MESH, and the investigation was started for this search result. Only original articles, reviews, and book chapters were included in the study by filtering the SCOPUS database—no country or language filtering was applied. A total of 27,596 studies were accessed in the SCOPUS database and searched by the keywords determined for pressure injury. After certain filters about the subject area were added, 4809 studies published in peer-reviewed journals including specific disciplines (Nursing, Engineering, Materials Science, Health Professionals, Social Sciences, Multidisciplinary Research, Computer Science, and Psychology) were reached.

## **2.6. Ethical Permission**

Ethical permission is not required as the data of the research constitutes published studies

## **2.7. Statistical Analysis**

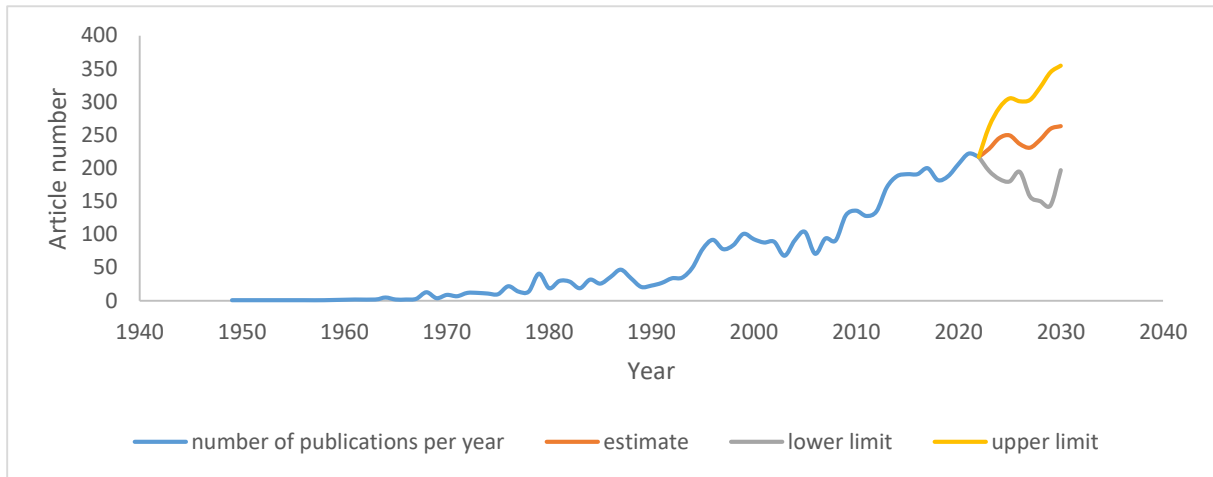
Ms office program was used to create the world map showing the graphics, five-year seasonal forecasts and the distribution of the articles by country. Statistical analyzes for correlation were performed with SPSS (Version 22.0, SPSS Inc., Chicago, IL) package program.



### 3.Results

As a result of the research, 4224 studies were reached in line with the filters made. It was determined that the first study on pressure injuries within the specified limits was made in 1949, and 89 studies were carried out in 2022 (Chart 1).

**Chart 1. Distribution of PI Articles Published by Year, and Predictions Number of Article in the Next Five Year**

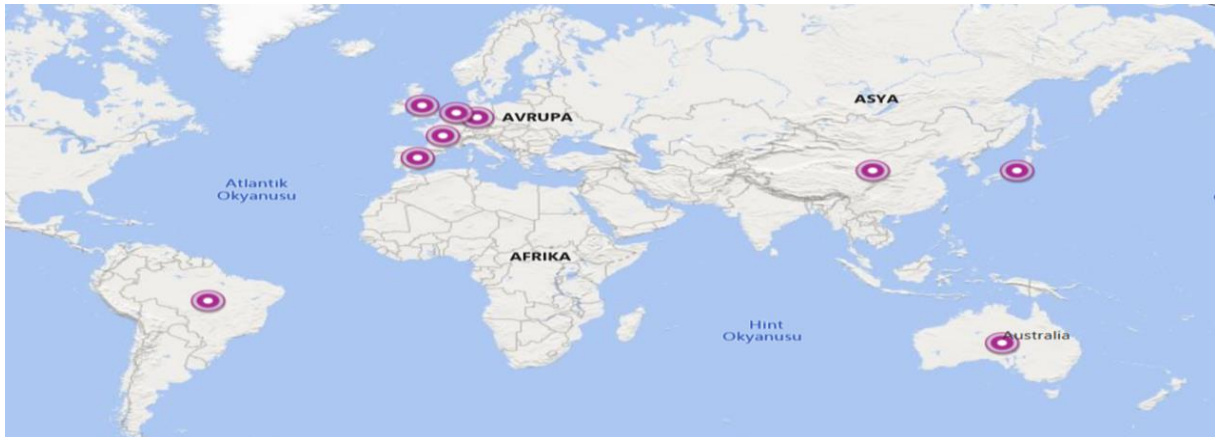


Accordingly, it was determined that 87.2% (n=3687) of the studies were published in the field of nursing and 13.3% (n=563) were published in the Journal of Wound Care. The distribution of the number of articles on the subject by years is shown in Graph 1. Looking at the forecast model, an average of 229 (min196-max263) in 2023, an average of 245 (min184-max291) in 2024, an average of 249 (min180-max305) in 2025, an average of 236 (min194-max301) in 2026, in 2027 t is estimated that the research article can be made an average of 236 (min194-max301). These analyzes were made at the 95% confidence interval the lower limit and upper limit by calculating using the seasonal forecast analysis tab in the Microsoft Excel program. Table 1 and Figure 1 show the languages and countries of the published studies on PI. 26.7% in the United States, 16.2% in the United Kingdom, 4.6% in Australia, 4.1% in Brazil, 2.8% in Spain, 2% in China and the Netherlands, 7% in Germany and 2% in Japan publication has been made. The languages of publication are respectively English, French, Spanish, Portuguese, Russian, German, Chinese, Italian, Korean, and Greek.

**Table.1 Top 10 Countries and Languages with the Most Research on Pressure Injury**

Country	Number (%)	Language	Number (%)
United States	1131 (%26.7)	English	3708 (%87.8)
United Kingdom	685 (%16.2)	French	199 (%4.7)
Australia	198 (%4.6)	Spanish	116 (%2.7)
Brazil	177 (%4.1)	Portuguese	111 (%2.6)
Spain	146 (%3.4)	Russian	46 (%1.1)
China	119 (%2.8)	German	29 (%0.6)
France	119 (%2.8)	Chinese	28 (%0.6)
Netherlands	117 (%2.7)	Italian	21 (%0.4)
Germany	87 (%2.1)	Korean	18 (%0.4)
Japan	84 (%2.0)	Polish	15 (%0.3)

\*n=4224



**Figure 1. Global World Map Showing the Distribution of Published Articles on Pressure Injuries by Country.**

Table 2 shows the most cited study, author and year information, and the number of citations. According to the table, the study titled "The Braden Scale for predicting pressure sore risk" by Bergstrom N. et al. published in the Journal of Nursing Research ranked first with 942 citations. The cited journals and the number of citations were related to nursing science.

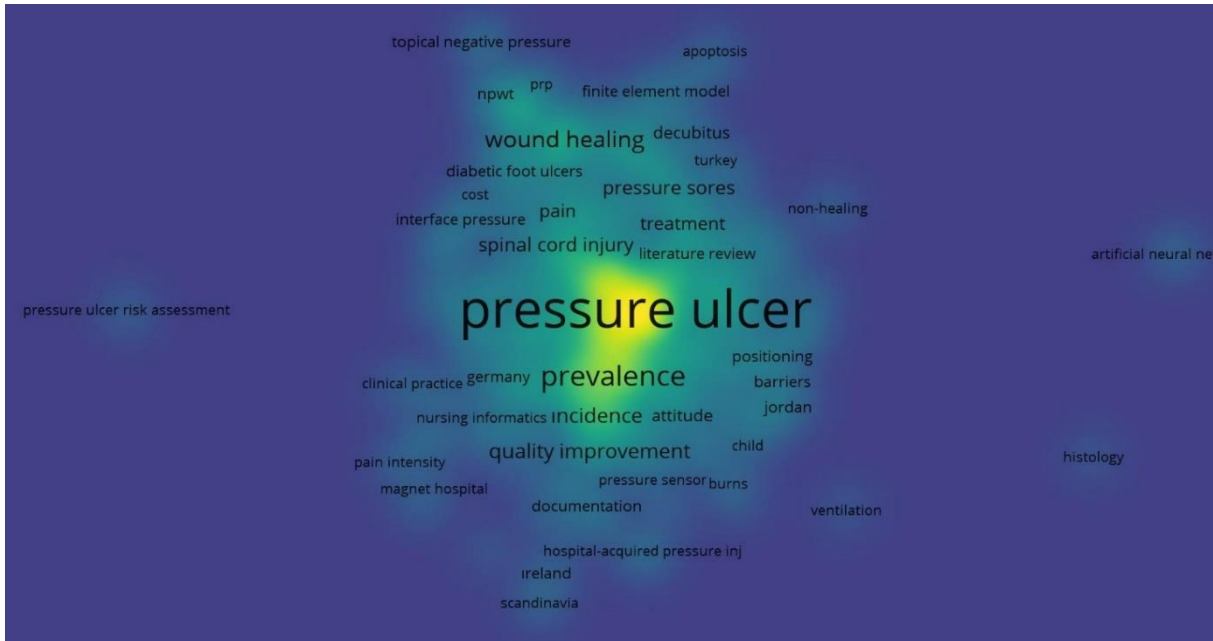
**Table 2 .Top 10 Most Cited Studies on Pressure Injuries (n=4224)**

References	Citation (n)	Sources	Year	Name of Article
<b>Bergstrom N, et al.</b> ((Bergstrom, Braden, Laguzza, & Holman, 1987))	942	<u>Nursing Research</u>	1987	<u>The braden scale for predicting pressure sore risk</u>
<b>Blum W, et al.</b> (10 )	403	<u>Proceedings of the National Academy of Sciences of the United States of America</u>	2010	<u>Clinical response and miR-29b predictive significance in older AML patients treated with a 10-day schedule of decitabine</u>
<b>Edsberg LE, el al.</b> ((Edsberg et al., 2016))	379	<u>Journal of Wound, Ostomy and Continence Nursing</u>	2016	<u>Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System</u>
<b>Coleman S, et al.</b> ((Coleman et al., 2013b))	379	<u>International Journal of Nursing Studies</u>	2013	<u>Patient risk factors for pressure ulcer development: Systematic review</u>
<b>Harrington, C, et al.</b> ((Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000))	366	<u>Journals of Gerontology - Series B Psychological Sciences and Social Sciences</u>	2000	<u>Nursing home staffing and its relationship to deficiencies</u>
<b>Pancorbo-Hidalgo, PL, et al.</b> ((Pancorbo-Hidalgo RN, Pedro Garcia-Fernandez, Lopez-Medina Student RN, Alvarez-Nieto, & Pancorbo-Hidalgo, 2006))	364	<u>Journal of Advanced Nursing</u>	2006	<u>Risk assessment scales for pressure ulcer prevention: A systematic review</u>
<b>Blegen MA, et al.</b> ( (Blegen, Goode, & Reed, 1998))	340	<u>Nursing Research</u>	1998	<u>Nurse Staffing and Patient Outcomes</u>
<b>Rimmer JH, et al.</b> ((Rimmer, 1999))	311	<u>Physical Therapy</u>	1999	<u>Health promotion for people with disabilities: The emerging paradigm shift from disability prevention to prevention of secondary conditions</u>
<b>Dealey C, et al.</b> ((Dealey, Posnett, & Walker, 2011))	305	<u>Journal of Wound Care</u>	2012	<u>The cost of pressure ulcers in the United Kingdom</u>
<b>Posnett J, et al.</b> ((Posnett & Franks, 2008))	293	<u>Nursing Times</u>	2008	<u>The burden of chronic wounds in the UK.</u>

### 3.1. Keyword Analysis and Trend Topics

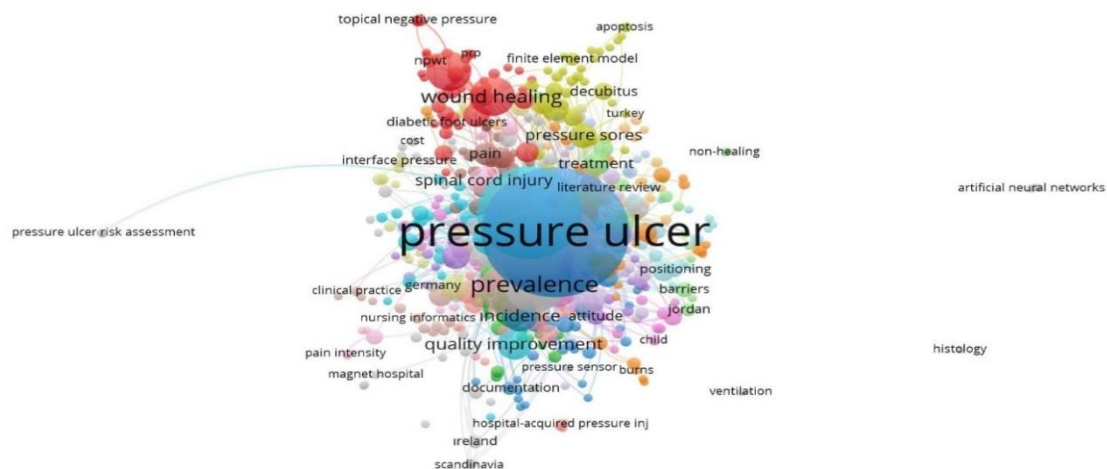


Visualized density maps of keywords are shown in Figure 2. According to Figure 2 yellow color gives the most frequently used keywords and it is seen that the most used keywords are pressure ulcer and prevalence. The cluster network visualization map shows the results. It was seen that PI subjects were divided into 31 different clusters.



**Figure 2. Visualized Density Map of Keywords**

Keywords collected as clusters in 31 different colors are shown in Figure 3. Each color denotes a distinct cluster. The color of keywords in the same group is the same. The circle represents the number of times the keyword is used in the article.



**Figure 3. Visualized Network Map of Related Keywords**





stated reasons. It has been determined in light of the findings that more studies have been carried out in the field of nursing compared to other fields. It was determined that only 2% of the studies were in the multidisciplinary field therefore, It is thought that the researches on interdisciplinary cooperation are insufficient. It was especially determined that the number of studies in the discipline of nursing is high. In light of the findings, integrating the scientific outputs of nursing research with different disciplines and research can provide important scientific contributions. ("Bilimsel Dergi-Vikipedi [https://Tr.Wikipedia.Org/Wiki/Bilimsel\\_dergi](https://Tr.Wikipedia.Org/Wiki/Bilimsel_dergi)," n.d.). Scientific journals are an effective way to present research results or an important topic and to guide research fields and researchers. According to the results of the research, it was determined that almost all of the studies on PI were published in journals related to nursing science. It is thought that PI awareness should be increased in the branches of science dealing with technical issues other than health and medicine, and therefore the number of publications should be increased. As a result, it can be aimed to increase awareness by increasing the number of publications in other scientific journals outside the field of nursing. The fact that English is a common language accepted in the world provides an advantage in accessing scientific knowledge in academic conditions. According to the results of the research, the percentage of publication language was determined as English. According to the research findings, the top 10 countries that have published on the subject are given. Although there are a limited number of studies, it has been determined that there are publications in countries such as Canada, Ireland, Turkey, and Finland. When we look at the results, the prevention policies of the countries suggest that the numbers for the number of publications may be related. The literature review is defined as a significant phase in the research process, but in practice, an inadequate review may cause the researcher to lose time due to difficulty accessing the content, so the importance of keywords in process management is emphasized (Köroğlu, 2015). The study revealed that the keyword "pressure ulcer" was used intensively, and especially the terms "incidence", "prevalence", "pain", "wound healing", and "decubitus" were related. It is thought that the map created for keywords will provide convenience and direction to researchers while searching the literature. In the network map for author collaboration, it was determined that authors were in collaboration under 27 clusters and the collaboration networks were clustered according to the colors. Author collaboration map, yellow, blue, green, red, orange, etc. showed that the authors interested in colors had more cooperation among themselves and the level of cooperation was intensely high between 2000-2010. It is thought that the level of cooperation has decreased in recent years. It is thought that this situation may be due to the increase in isolation due to increasing infectious diseases and quarantine processes, and the decrease in the number of publications and collaborations on the subject. The effectiveness of scientific publications is determined by bibliometric studies. With these studies, the most productive authors, countries, organizations, cooperation between authors, and keywords used in the literature review can be determined and can guide different research topics and authors. (Akyüz & Alkan, 2022). Studies conducted with the bibliometric analysis method for different fields are found in the literature (Benton, Cusack, Jabbour, & Penney, 2016; Cullen, 2016; Damar Turhan, Bilik, Ozdagoglu, Ozdagoglu, & Damar, 2018; Prado-gasc, Giménez-, & De Witte, 2021). It is becoming increasingly challenging for researchers working in nursing and other disciplines to find a research topic, search the literature, or publish research results, so studies conducted with the bibliometric analysis methods can contribute to researchers in this competitive environment (Damar Turhan et al., 2018). It is estimated that this study, which will be a source for examining the current situation in pressure injuries, will contribute to future studies.

## 5. Conclusion and Sugestions

It was concluded that despite the increasing number of studies on pressure injury over the years, there was a decrease in author collaboration, the studies were primarily conducted in nursing and published in relevant journals, and there was a lack of a multidisciplinary approach. With this research, new researchers will be asked research to be conducted on the subject when researching pressure injury, it





provides researchers with which keywords they can use, which authors' articles they can review, and collaborative research by the authors. Based on the research results, encouraging interdisciplinary collaboration and interdisciplinary cooperation is recommended for pressure injury prevention. It was concluded that despite the increasing number of studies on pressure injury over the years, there was a decrease in author collaboration, the studies were primarily conducted in nursing and published in relevant journals, and there was a lack of a multidisciplinary approach. With this research, new researchers will be asked research to be conducted on the subject when researching pressure injury, it provides researchers with which keywords they can use, which authors' articles they can review, and collaborative research by the authors. Based on the research results, encouraging interdisciplinary collaboration and interdisciplinary cooperation is recommended for pressure injury prevention.

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## Declarations

The research was not produced from any thesis and was not published as a paper. Ethical permission: Ethical permission is not required as the data of the research constitutes published studies. Data availability declaration: Data supporting the findings of this study are openly available at <https://www.scopus.com/search/form.uri?display=basic#basic>.