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Research Article

PEDIATRIC ACCEPTANCE AND SWALLOWABILITY OF MINITABLETS: A BIBLIOMETRIC ANALYSIS

MAHESH PATIL, SNEHA BIRE, OMKAR TEKADE*, VINITA KALE, SUANKIT HARANE, MILIND UMEKAR

Department of Regulatory Affairs. Smt. Kishoritai Bhoyar College of Pharmacy, Nagpur, Maharashtra, India
***Corresponding author: Omkar Tekade; Email: omkartekade18@gmail.com**

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ABSTRACT

Objective: This study examines current ongoing research in the area of acceptance and swallowability of minitablets in pediatrics. The purpose behind this enquiry is due to the need for the development of minitablets for pediatric use and determining the safety, acceptability, and swallowability of minitablets in children. By going through this article, one will gain knowledge about the aspects in which research has been completed and which areas are yet to be explored.

Methods: The primary goal of this investigation is to combine research published on the acceptance and swallowability of minitablets in pediatrics from the year 1989 to 2023 in journals indexed by Web of Science (WoS) Core Collection database. Employing bibliometric techniques such as authorship pattern, countries involved, funding agencies, co-authorship pattern etc.

Result: A total of 111 documents have been found from the year 1989 to 2023 with a total of 2,993 citations received so far. The active years of publications are from 2012 to 2023. The countries contributing to this research topic are England, Germany, the USA, France, Netherlands, Switzerland, Japan, Belgium, Italy, Norway, Poland, India, and Canada. For accurate searching and retrieving of data keywords and Boolean operators such as "mini tablet*" AND ("pediatric" OR "children") AND "safety" AND ("swallow*" OR "accept*") are used.

Conclusion: This bibliometric analysis displays and provides information on this topic and can be used for identifying recent trends, most prolific authors, most impactful journals, and contributing countries for research on acceptance and swallowability of minitablets in pediatrics.

Keywords: Minitablets, Pediatrics, Acceptance, Swallowability, Bibliometric analysis.

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INTRODUCTION

Recent modifications to regulatory regulations supporting the production of age-appropriate medications have brought about a transition in the field of pediatric formulation development. Age-appropriate dose forms have therefore been created in response to the growing focus on pediatric care. Pediatric minitablets in sachet or capsule form are one dose type that permits flexibility in dosage. The Food and Drug Administration classifies them as oral granules when their average diameter is <2.5 mm. It is possible to combine several minitablets into a single dosage unit to provide the required amount, allowing for personalized therapies to be used on populations other than children [1].

Depending on their weight, age, natural capacity to metabolize pharmaceuticals, the specifics of their illness, or the existence of co-morbid conditions people react to medications quite differently. Notably, pediatric patients are a very sensitive and heterogeneous group of people, which makes matters more difficult. Given that children are not like adults in terms of taste preferences or their capacity to ingest dose forms, which can lead to toxicity from formulations, medical treatments in this situation can be quite difficult. Furthermore, because a drug's pharmacokinetic and pharmacodynamic profile varies greatly depending on the age of the child, pediatric medications need to adapt to the child's growth by changing in size over time. This calls for flexible dosages and a variety of administration methods [2].

Syrups and tablets are commonly used for children because they are easy to administer. However, adjusting the dose can be tricky. Many parents tend to break tablets in half to give to their children, which can lead to improper dosage and affect the medicine's effectiveness. In addition, conventional dosage forms often face challenges with patient compliance. Viviane Klingmann and team conducted clinical trials on newborns and pre-schoolers to compare the acceptance of minitablets with syrups. The study, which included 306 children, showed that uncoated minitablets were better accepted than syrups. Children aged 6 months to 6 years were found to have better swallowing ability for uncoated minitablets, making them more suitable than liquid formulations [3]. Minitablets are a type of solid oral dosage form with a diameter of 3 mm or less. They are considered a part of multiparticulate drug delivery systems, along with granules and pellets, because they consist of multiple small units. This multiunit composition provides dose flexibility and allows minitablets to be either filled into capsules or compressed into larger tablets, reducing the need to take several individual tablets [4].

Often, children cannot get mass-produced dose forms for the treatment of pediatric disorders. To treat hospitalized children, guardians frequently manipulate and combine commercially accessible pharmaceuticals with food at home, or they frequently generate random remedies in hospital pharmacies. In spite of significant efforts by regulatory bodies, behaviors that are dubious and maybe hazardous are still encountered by the pediatric population. The capacity to precisely control dosage while guaranteeing constituent safety is crucial when developing medications for youngsters. Because of their more stable and straightforward formula, solid formulations may be a good substitute for liquid formulations in these situations. Minitablets may also be a workable solution to the swelling ability issue [5].

This study mainly focuses on bibliometric analysis of acceptance of minitablets in pediatrics'. It highlights areas such as contributing authors, affiliations involved in this research, number of publications

per year, and countries involved in this research. Our study consists of data obtained from Web of Science (WoS) Core Collection database from year 1989 to 2023 involving a total number of 111 publication's. In addition to this, our search addresses the following research questions:

Research questions:

1. What countries and institutions are leading the research on acceptance of minitablets in pediatrics'?
2. Which journals have most significant impact on acceptance of minitablets in pediatrics'?
3. Which are the most popular and highly cited publications concerning acceptance of minitablets in pediatrics'?
4. Can you provide insights into authorship and collaborative research patterns in field of acceptance of minitablets in pediatrics'?
5. What are emerging research themes and keywords in the context of acceptance of minitablets in pediatrics'?

METHODOLOGY

The objective of this bibliometric analysis is to delve into publication patterns of safety and acceptance of minitablets in pediatrics. This study focuses on examining factors such as total citations (TC), publication year (PY), and authorship patterns, co-authorship between countries and organizations. The data accumulation process facilitated the identification of prominent authors, journals, countries, and affiliations.

Database and bibliographic information on the use of minitablets in pediatric

This current data relies on information extracted from WoS Core Collection database. WoS is well renowned for its credibility and world-wide recognition for indexing and abstracting information. By applying bibliometric analysis, a statistical approach to the data extracted from WoS we examined scholarly articles and delve into various trends required for analysis in this domain.

Search query for extraction of bibliographic data on the use of minitablets in pediatric

On May 2nd, an extensive search was carried out on WoS database at Smt. Kishoritai Bhoyar College of Pharmacy in Kamptee, Nagpur. The search aimed to retrieve bibliographic data on the safety and acceptance of minitablets in pediatrics using keywords and Boolean operators such as "mini tablet*" AND ("pediatric" OR "children") AND "safety" AND ("swallow*" OR "accept*"). This query was executed in WoS Core Collection to ensure thorough exploration of literature.

Inclusion/exclusion criteria in search query

For obtaining precision, a set of inclusion and exclusion criteria was employed as depicted in the figure. To narrow down the search, keywords were searched specifically with titles and Boolean operators such as "mini tablet*" AND ("pediatric" OR "children") AND "safety" AND ("swallow*" OR "accept*") were used resulting in 111 documents. Titles were searched in all fields and no filter of article or review article was applied. The search resulted in 111 publications from the year 1989 to 2024. Moreover, h index for this search was found to be 30. For 111 publications, TCs received were 2,993 times.

Data analysis and visualization in search query

One hundred and eleven publications were analyzed and visualized carefully using software and tools such as MS Excel and VOS Viewer. Bibliometric indicators such as citation trends, authorship pattern, and cited countries were explored.

RESULTS

Performance analysis for distinctive features

Performance analysis focuses on the contributions that various research components have made to a certain field. The distinctive feature of bibliometric studies is the analysis, which is descriptive in character. It is common practice in reviews to showcase the performance of various research contributors, such as authors, institutions, countries, and journals, similar to how participant profiles are presented in empirical studies. As a result, performance analysis is often included in reviews, even in those that do not focus on science mapping. [6].

Number of contributing authors contributed in the field of minitablets in pediatric

Fig. 1 and Table 1 shows the data about the most prolific authors, their publications, and number of citations received in safety and acceptability of minitablets in pediatrics. As per the data, Breitkreutz and Joerg, the top-ranked authors have 15 publications, 795 citations, and a total link strength of 882. They are followed by Klingmann and Viviane, ranked second, with 14 publications, 553 citations, and a total link strength of 943. Bosse and Hans Martin, ranked third, have 8 publications, 330 citations, and a total link strength of 670. Tuleu and Catherine, ranked fourth, also have 8 publications but with 309 citations and a total link strength of 335. Meissner and Thomas, ranked fifth, have 6 publications, 460 citations, and a total link strength of 718. Apart from Meissner and Thomas, other notable contributors to minitablets research include Walsh and Jennifer, Rademaker and Carin, and Van Riet-Nales and Diana.

Number of contributing funding agencies contributed in the field of minitablets in pediatric

Fig. 2 and Table 2 shows the data about the top 10 funding agencies. European Union (EU) and UK Research Innovation (UKRI) are the top most funding agencies that fund the research on the safety and acceptability of minitablets in pediatrics with 5 programs funded by each agency; whereas Engineering Physical Sciences Research Council and Pfizer ranked third and fourth, respectively, have funded 3 programs each; whereas funding agencies such as AstraZeneca, Bill Melinda Gates Foundation, Bristol Myers Squibb, GlaxoSmithKline,

Table 1: Number of contributing authors in the field of minitablets in pediatric

Author	Documents	Citations	Total link strength
Breitkreutz, Joerg	15	795	882
Klingmann, Viviane	14	553	943
Bosse, Hans martin	8	330	670
Tuleu, Catherine	8	309	335
Meissner, Thomas	6	460	718
Walsh, Jennifer	6	155	242
Rademaker, Carin M.A.	5	350	185
Van Riet-Nales, Diana A.	5	199	174
Breitkreutz, Jorg	4	24	163
Egberts, Toine C. G.	4	157	146

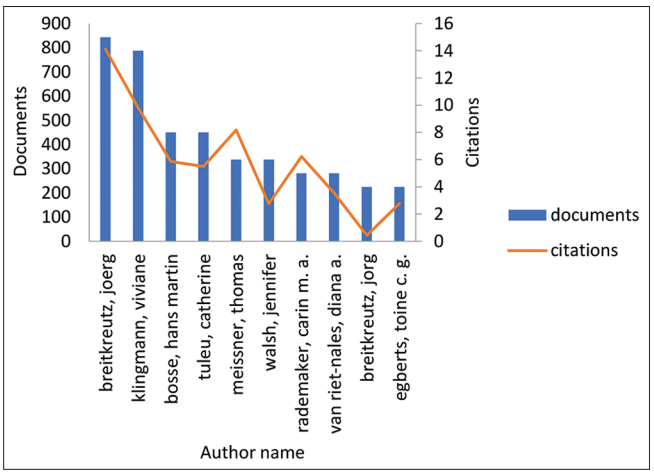

Fig. 1: Number of contributing authors in the field of minitablets in pediatric

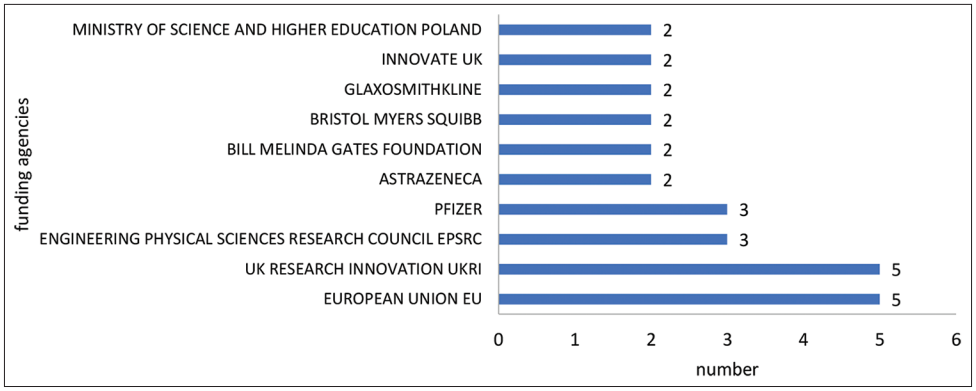

Fig. 2: Number of Funding agency contributed in the field of minitablets in pediatric

Innovate UK, and Ministry of Science and Higher Education Poland have funded 2 programs each.

Number of active years of publication in the field of minitablets in pediatric

Fig. 3 and Table 3 shows the data about the number of publications in the past 12 years from 2012 to 2023. According to the data, the highest number of publications was in 2022, with 18 publications. This was followed by 14 publications each in 2020 and 2023. In 2012, only 2 publications were recorded, but the number increased to 3 publications each in 2013 and 2014. A sharp rise was observed in 2015, with a total of 10 publications. In 2016 and 2017, there were 6 and 9 publications, respectively, whereas 2018 recorded a total of 11 publications.

Number of leading publishers who contributed in the field of minitablets in pediatric

Fig. 4 shows and Table 4 the data about the most leading journals for publishing research on the safety and acceptability of minitablets in pediatrics. Elsevier, Multidisciplinary Digital Publishing Institute (MDPI), Springer Nature, Taylor and Francis, Wiley, British Medical Journal (BMJ) Publishing Group, Pharmaceutical Soc Japan, Amer American Academy of Arts and Sciences, (ACAD) Pediatrics, BMJ Publishing Group, and Begell House Inc are the top 10 publishers on research related to minitablets. Elsevier is ranked as the top publisher with a total of 44 publications on this topic. It is followed by the MDPI, ranked second with 19 publications. Springer Nature takes the third position with 14 publications. Meanwhile, Taylor & Francis, Wiley, the BMJ Publishing Group, and the Pharmaceutical Society of Japan have published 9, 7, 4, and 3 articles, respectively. Apart from this, Innovare Academic Sciences have published 4 review articless on the topic of minitablets.

Number of active countries who contributed in the field of minitablets in pediatric

According to the data shown in Fig. 5 and Table 5, the leading countries where research on safety and acceptability of minitablets in pediatrics is performed are England, Germany, the USA, and France. England, ranked 1st, leads with 33 publications, followed by Germany in 2nd place with 32 publications. The USA, ranked 3rd, has a total of 19 publications. France and the Netherlands each have 12 publications. Other notable countries contributing to research on the safety and acceptability of minitablets in pediatrics include Switzerland, Japan, Belgium, Italy, Norway, and Poland. India has recorded 4 publications in this area so far.

Science mapping to check the interaction in different aspects of research

Science mapping focuses on the interactions between every aspect of research. The analysis focuses on the structural relationships and intellectual interactions between the research components. Citation analysis, cocitation analysis, bibliographic coupling, coword analysis, and coauthorship analysis are among the methods used in science mapping. These methods play a crucial role in revealing the

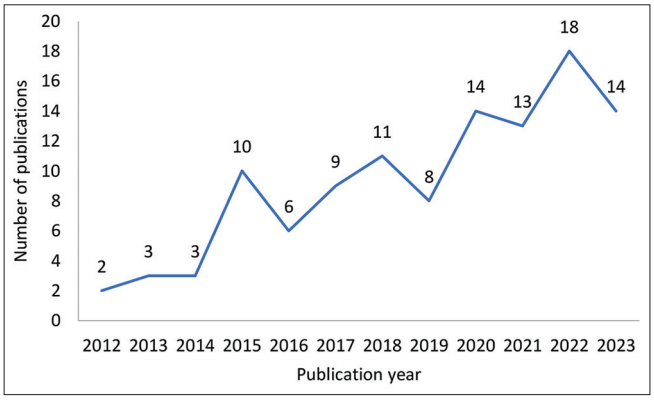

Fig. 3: Active publication year in the field of minitablets in pediatric

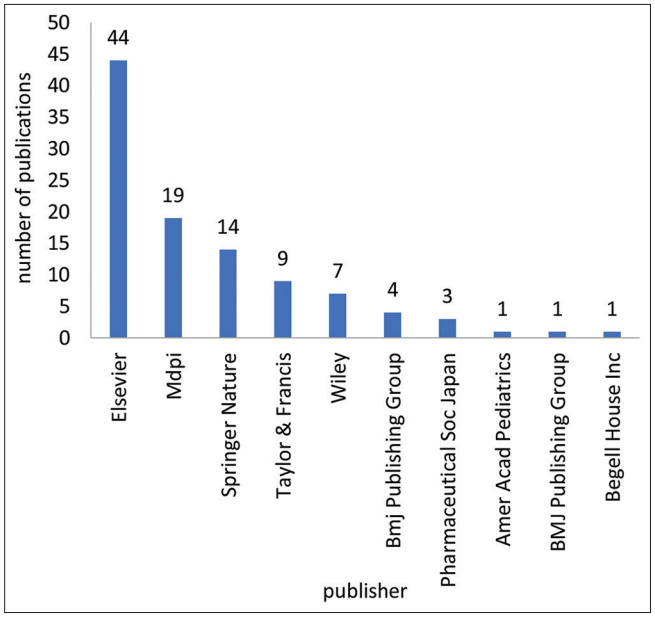

Fig. 4: Leading publishers who contributed in the field of minitablets in pediatric

intellectual and bibliometric structures of the study field when paired with network analysis [6].

Co-authorship network between countries who contributed in the field of minitablets in pediatric

Fig. 6 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for coauthorship patterns

between countries. To set the threshold, a minimum of two documents per country were selected. Based on this criterion, 22 out of 39 countries met the threshold. According to the data, England ranked first with 33 documents, 1,011 citations, and a total link strength of 39. Germany followed in the second place with 32 documents, 1,046 citations, and a total link strength of 34.

Out of 22 countries, only 19 countries are connected to each other and they form 7 clusters with each other. Cluster 1 comprises a structure that connects 4 countries (Italy, Norway, Poland, and Spain), Cluster 2 comprises a structure that connects 3 countries (Australia, Belgium, and Netherlands), Cluster 3 comprises a structure that connects 3 countries (India, Saudi Arabia, and Switzerland), Cluster 4 comprises a structure that connects 3 countries (Canada, China, and USA), Cluster 5 comprises of a structure that connects 2 countries (Bulgaria and Germany), Cluster 6 consist of 2 items (England and turkey), and Cluster 7 consist of 2 items (France and Ireland). Each cluster has a different color and their appearance is based on link strength and number of documents.

Co-authorship networks between organizations for contribution in the field of minitablets in pediatric

Fig. 7 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-authorship patterns between organizations. To set the threshold, a minimum of two documents from each organization was selected. Using this method, only 54 out of 248 organizations met the threshold. The total strength of co-authorship links with their respective organizations was calculated,

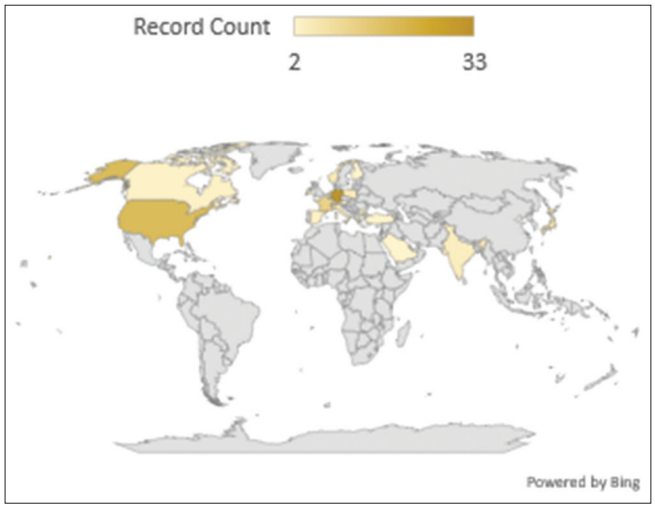

Fig. 5: Active countries who contributed in the field of minitablets in pediatric

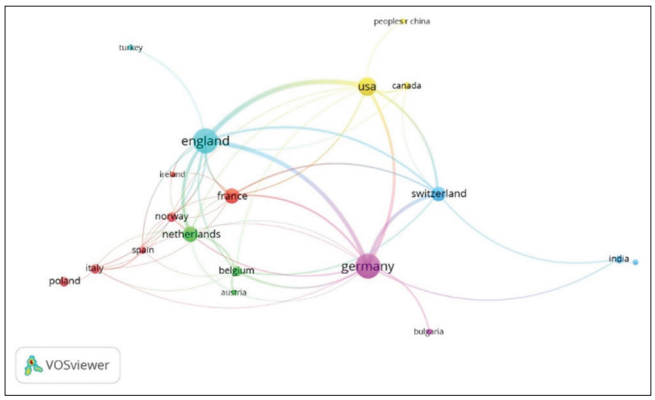

Fig. 6: Co-authorship network between countries who contributed in the field of minitablets in pediatric

and the data showed that Jenny Walsh Consulting Ltd, Ernst Moritz Arndt University Greifswald, and Bristol Myers Squibb are the top three leading organizations.

Out of 54 countries, only 40 are interconnected, forming six clusters. The breakdown of these clusters is as follows: Cluster 1 includes 10 countries, Cluster 2 includes 8 countries, Cluster 3 has 7 countries, and Cluster 4 also has 7 countries, whereas Cluster 5 and Cluster 6 each consist of 4 countries.

Co-authorship network between authors who contributed in the field of minitablets in pediatric

Fig. 8 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-authorship pattern between authors. To set the threshold, a minimum of 2 documents per author was selected to determine co-authorship among the authors. Out of 479 authors, only 79 met this threshold. Based on the data, Klingmann and Viviane are ranked number 1, with 14 documents, 553 citations, and a total link strength of 57. They are followed by Breitkreutz and Joerg, ranked number 2, with 15 documents, 795 citations, and a total link strength of 39.

Out of 79 authors, only 38 are connected to each other, forming a total of 4 clusters. The clusters are divided as follows: Cluster 1 consists of 12 authors, Cluster 2 consists of 12 authors, Cluster 3 consists of 7 authors, and Cluster 4 consists of 7 authors.

Co-occurrence of all keywords contributed in the field of minitablets in pediatric

Fig. 9 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-occurrence of all keywords. To set the threshold, the minimum number of occurrences

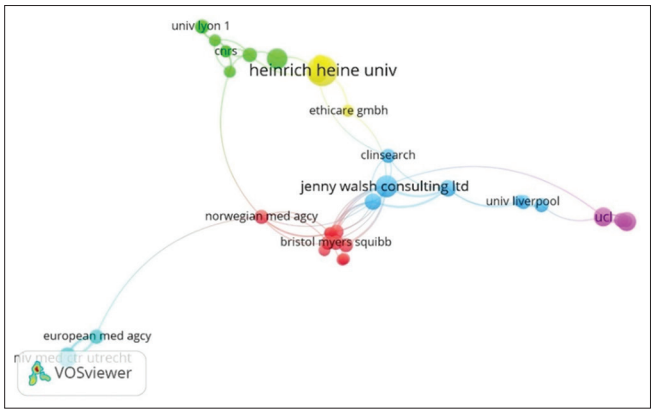

Fig. 7: Co-authorship networks between organization for contribution in the field of minitablets in pediatric

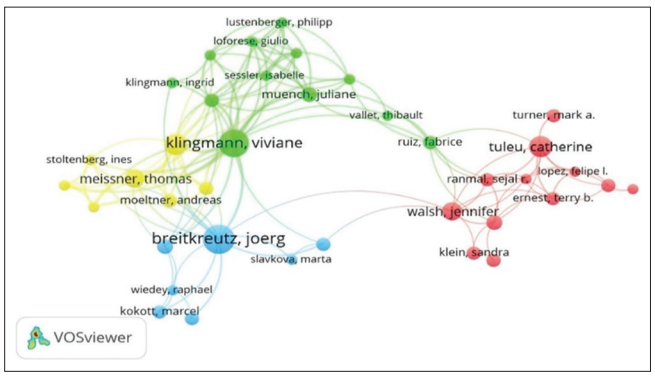

Fig. 8: Co-authorship network between authors who contributed in the field of minitablets in pediatric

for a keyword was selected as 2 to calculate the total strength of its co-occurrence link with other keywords. Out of 621 keywords, 165 met the given threshold. According to the data, "acceptability" occurred 58 times, "minitablets" appeared 51 times, and "medicine" had 41 occurrences.

A total of 165 keywords are connected with each other and form 9 clusters. The breakdown of the clusters is as follows: Cluster 1 consists of 28 keywords, Cluster 2 consists of 24 keywords, Cluster 3 consists of 24 keywords, Cluster 4 consists of 23 keywords, Cluster 5 consists of 21 keywords, Cluster 6 consists of 16 keywords, Cluster 7 consists of 15 keywords, Cluster 8 consists of 12 keywords, and Cluster 9 consists of 2 keywords.

Co-citations of countries who contributed in the field of minitablets in pediatric

Fig. 10 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-citations among the countries. To set the threshold, the minimum two number of documents from a country was chosen to determine the total strength of citation links with other countries. Out of 39 countries, 22 met this threshold. According to the data, the top three countries are Germany, England, and the USA. Germany has 38 documents, 1046 citations, and a total link strength of 520, followed by England with 33 documents, 1011 citations, and a total link strength of 379. The USA has 19 documents, 370 citations, and a total link strength of 173.

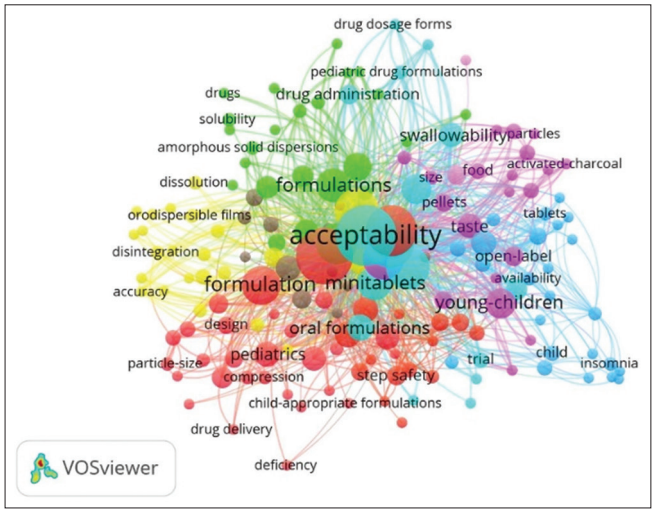

Fig. 9: Co-occurrence of all keywords contributed in the field of minitablets in pediatric

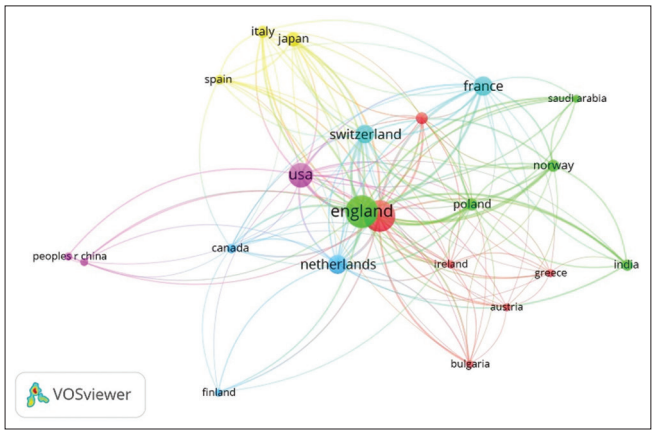

Fig. 10: Co-citations of countries who contributed in the field of minitablets in pediatric

22 countries are connected with each other and form a total of 6 clusters. The distribution of countries across these clusters is as follows: Cluster 1 consists of 6 countries, Cluster 2 consists of 5 countries, Cluster 3 consists of 3 countries, Cluster 4 consists of 3 countries, Cluster 5 consists of 3 countries, and Cluster 6 consists of 2 countries.

Co-citation patterns of journals contributed in the field of minitablets in pediatric

Fig. 11 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-citation patterns of journals. To set a threshold, the minimum two number of documents from a source was selected to determine the TC link strength with other sources. Out of 46 sources, 12 met this threshold. According to the data, the top three sources are: The International Journal of Pharmaceutics with 23 documents, 529 citations, and a total link strength of 144; followed by the Journal of Pediatrics with 3 documents, 286 citations, and a total link strength of 124; and Pharmaceutics with 17 documents, 221 citations, and a total link strength of 97.

12 sources are connected with each other and form 3 clusters. The delineation of clusters is as follows cluster 1 consist of 4 sources, cluster 2 consist of 4 sources, cluster 3 consist of 4 sources.

Co-citation networks of documents contributed in the field of minitablets in pediatric

Fig. 12 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-citation networks of documents. To set the threshold, a minimum of 3 citations per document was chosen to determine the number of citation links. Out of 111 documents, only 92 met this threshold. The top-cited documents based on the data are: Klingmann (2013) with 134 citations and 62 links, followed by Klingmann (2015) with 108 citations and 33 links, and Spomer (2012) with 130 citations and 51 links.

Out of 92 documents, 91 are interconnected and form 12 clusters. The breakdown of the clusters is as follows: Cluster 1 consists of 16 documents, Cluster 2 consists of 11 documents, Cluster 3 consists of 9 documents, Cluster 4 consists of 9 documents, Cluster 5 consists of 8 documents, Cluster 6 consists of 8 documents, Cluster 7 consists of 8 documents, Cluster 8 consists of 6 documents, Cluster 9 consists of 6 documents, Cluster 10 consists of 5 documents, Cluster 11 consists of 3 documents, and Cluster 12 consists of 2 documents.

Co-citation networks of authors who contributed in the field of minitablets in pediatric

Fig. 13 illustrates the science mapping of our keyword's safety and acceptance of minitablets in pediatrics for co-citation networks of authors. To establish a threshold, the minimum number of documents per author was set at 2 to link citation data with authors. Out of

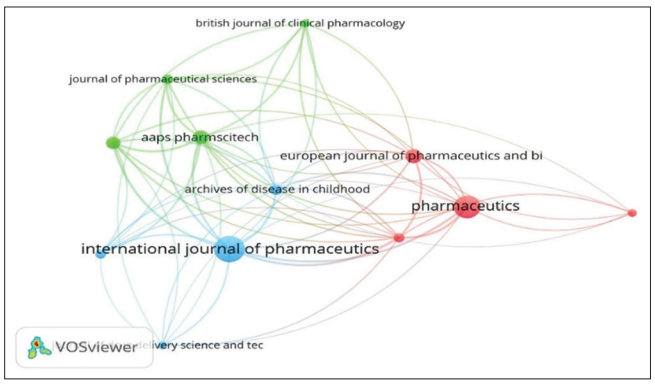

Fig. 11: Co-citation patterns of journals contributed in the field of minitablets in pediatric

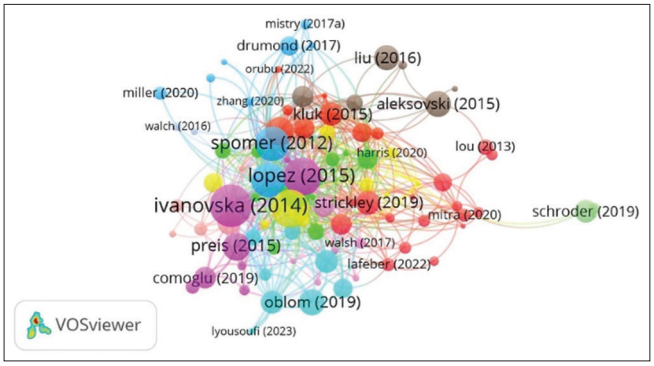

Fig. 12: Co-citation networks of documents contributed in the field of minitablets in pediatric

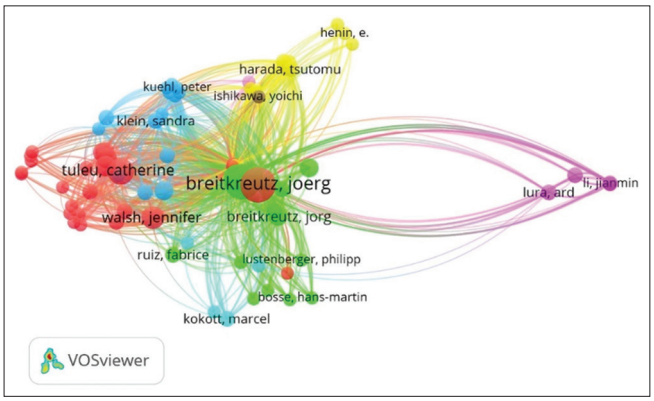

Fig. 13: Co-citation networks of authors who contributed in the field of minitablets in pediatric

479 authors, 79 met this threshold. According to the data, Klingmann and Viviane are ranked number 1 with 14 documents, 553 citations, and a total link strength of 943. They are followed by Breitkreutz and Joerg, ranked number 2 with 15 documents, 795 citations, and a total link strength of 882. Meissner and Thomas are ranked number 3 with 6 documents, 460 citations, and a total link strength of 718.

Out of 79 authors, 78 are connected with each other and form 9 clusters. The breakdown of the clusters is as follows: Cluster 1 consists of 24 authors, Cluster 2 consists of 15 authors, Cluster 3 consists of 14 authors, Cluster 4 consists of 10 authors, Cluster 5 consists of 8 authors, Cluster 6 consists of 4 authors, Cluster 7 consists of 1 author, Cluster 8 consists of 1 author, and Cluster 9 consists of 1 author.

DISCUSSION

This bibliometric analysis is the first of its kind as it is aimed to identify and evaluate the scientific research articles published on minitablets in pediatrics.

Authors who contributed in the field of minitablets in pediatric

The analysis of authorship pattern gave information such as the most prolific authors involved in this research, number of documents published by them, number of citations received, and total l8 ink strength of authors. According to the data, Breitkreutz and Joerg, Klingmann and Viviane, and Bosse and Hans are the top three authors. Furthermore, Breitkreutz and Joerg has a total of 15 publications they received 795 citations and their total link strength is 882. Klingmann and Viviane has 14 publications, 553 citations, and 943 total link strength. Bosse and Hans-Martin has 8 publications, 330 citations, and total link strength is 670. Other authors such as Meissner and Thomas, Walsh and Jennifer, Rademaker and Carin, Van Riet-Nales, and Diana are authors with significant impact.

Table 2: number of Funding agency contributed in the field of minitablets in pediatric

Funding agencies	Record count
European Union	5
Uk Research Innovation	5
Engineering Physical Sciences Research Council	3
Pfizer	3
AstraZeneca	2
Bill Melinda Gates Foundation	2
Bristol Myers Squibb	2
GlaxoSmithKline	2
Innovate Uk	2
Ministry of Science and Higher Education Poland	2

Table 3: Active publication year in the field of minitablets in pediatric

Publication years	Record count
2012	2
2013	3
2014	3
2015	10
2016	6
2017	9
2018	11
2019	8
2020	14
2021	13
2022	18
2023	14

Table 4: Leading publishers who contributed in the field of minitablets in pediatric

Publishers	Record count
Elsevier	44
Multidisciplinary Digital Publishing Institute	19
Springer Nature	14
Taylor and Francis	9
Wiley	7
British Medical Journal Publishing Group	4
Pharmaceutical Society Japan	3
Amer American Academy of Arts and Sciences, (ACAD) Paediatrics	1
British Medical Journal Publishing Group	1
Begell House Inc	1

Funding agencies contribuying in the field of minitablets in pediatric

According to an analysis of the funding agencies involved in research on minitablets for pediatrics European Union EU, UKRI, Engineering Physical Sciences Research Council, Pfizer, and AstraZeneca are the top agencies that have provided funds for research on minitablets. These data are useful for selecting funding agency and gives an estimate of various funding agencies that provide funds to research in this respective domain.

Active PY contributed in the field of minitablets in pediatric

The analysis of yearly publications and citations on acceptance and swallowability of minitablets in pediatrics gives the evolution of this topic according to year. The data obtained had publications from the year 1989 to 2023, but there was a significant rise in number of publications from 2012 onward and the maximum publications were in the year 2022. According to the data, highest publications were published in the year 2022, 2020, and 2023 with 22, 14, and 14 publications per year, respectively. In the year 2012, there were only 2 publications with an

Table 5: Active countries who contributed in the field of minitablets in pediatric

Countries/regions	Record count
England	33
Germany	32
USA	19
France	12
Netherlands	12
Switzerland	11
Japan	7
Belgium	5
Italy	5
Norway	5
Poland	5
India	4
Canada	3
Spain	3
Austria	2
Bulgaria	2
Finland	2
Greece	2
Ireland	2
Peoples R China	2
Saudi Arabia	2
Turkey	2

increase in number of publications in the year 2013 and 2014 that is 3 publications each year. Then, in 2015, there was a sudden increase in number of publications that is total of 10 publications. Years 2016 and 2017 have 6 and 9 publications, respectively, then 2018 has a total of 11 publications. According to the data and bibliometric analysis performed, we can estimate the years in which maximum and minimum research were published.

Leading publishers who contributed in the field of minitablets in pediatric

According to analysis of leading publishers in research for acceptance of minitablets in pediatrics, Elsevier, MDPI, Springer Nature, Taylor and Francis, Wiley, BMJ Publishing Group, Pharmaceutical Society Japan, Amer American Academy of Arts and Sciences, (ACAD), and BMJ Publishing Group and Begell House Inc., are the top 10 publishers on research related to minitablets. Where Elsevier has a total of 44 publications, and MDPI has 19 publications they are the top two leading publishers to publish research articles that focus on this topic. On the other hand, BMJ publishing group and Begell House Inc. are the publishers with lesser number of publications.

Countries contributed in the field of minitablets in pediatric

According to the analysis, the most influential countries where research on minitablets are taking place are England, Germany, USA, and France. Where England ranked 1st has 33 publications followed by Germany ranked 2nd with 32 publications. The USA which is 3rd in the list has a total of 19 publications. France and Netherlands have 12 publications each. Switzerland and Japan have 11 and 7 publications, respectively. Belgium, Italy, Norway, and Poland are some other leading countries with research on the safety and acceptability of minitablets in pediatrics. This information showcases the impact of this topic on global landscapes.

Co-authorships between countries, organizations, and authors who contributed in the field of minitablets in pediatric

The application of co-authorship between countries, organizations, and authors gives insights in examining patterns in relevant literature. This approach reveals clusters of co-authorship patterns between countries, organizations, and authors involved in this research. According to the cluster, England and Germany are the two countries that have highest co-authorship with other countries. Organizations such as Jenny Walsh Consulting Ltd, Ernst Moritz Arndt Univ Greifswald, and Bristol Myers Squibb are the top 3 leading organizations who have worked with other organizations on research of related to minitablets. Klingmann and Viviane are the author with highest co-authorship. According to data and respective figures, this information shows the collaborations of countries, organizations, and authors for making an impact on the global level in this particular domain of research.

Co-occurrence of all keywords contributed in the field of minitablets in pediatric

Keyword co-occurrence network provide means to showcase the relationship between keywords that are used in this research. The proximity of keyword reflects their similarity for closely related keywords appearing together. According to data, the most used keywords are "acceptability", "mini-tablets", and "medicine". This analysis underscores the dynamic interplay between keywords and offers avenues for further exploration in the field. The data and respective figures showcase the maximum number of occurrences of keywords used in research on this domain.

Citations of countries, sources, documents, and authors contributed in the field of minitablets in pediatric

The cluster of citations of countries, sources, documents, and authors shows number of citations received by the respective class. The most cited countries are Germany, England, and USA; the most cited sources are the International Journal of Pharmaceutics and Journal of Pediatrics; Klingmann (2013), Klingmann (2015), and Spomer (2012) are the most cited sources; most cited authors are Klingmann and Viviane. These clusters highlight network of citation and collaborative work between various countries, authors, and documents.

Limitations of this Study

This study has certain limitations or certain inclusion and exclusion criteria were used like, data included in this analysis was extracted only from web of science (WoS) database and any other database such as Scopus, PubMed, google scholar were excluded out. Content from sources such as meetings, case studies or reports, letters, and conferences were excluded and data from research publications were included in the study. The number of keywords used was limited although more keywords could be possibly used for better search and precise analysis. Science mapping in this bibliometric analysis was performed using only one software that is VOSviewer and software such as Biblioshiny was excluded from the study; other than VOSviewer software such as MS Excel and MS Word were included in the study.

Despite these limitations, this review gives future investigators or researchers to identify future trends, the most contributing authors, leading countries where research is been carried out in minitablets for pediatrics.

CONCLUSION

The primary goal of this research was to conduct an in-depth bibliometric analysis on the acceptance and swallowability of minitablets in pediatrics. Key areas such as the number of contributing authors, number of active years of publication, number of active countries, co-authorship pattern, and citation network were analyzed. Among the contributing authors, Joerg Breitkreutz and Viviane Klingmann have the highest number of publications and have received the greatest number of citations. The first article on this domain was published in 1989 but the active years of publications are from 2012 to 2023. In 2015, there was sudden rise in number of publications published in this particular domain. The countries with most contribution in research on minitablets are England, Germany, USA, France, Netherlands, Switzerland, Japan, Belgium, Italy, Norway, Poland, India, and Canada. Most leading journals for publishing are Elsevier, MDPI, Springer Nature, Taylor and Francis, Wiley, BMJ Publishing Group, Pharmaceutical Soc Japan, Amer American Academy of Arts and Sciences, (ACAD) Paediatrics, BMJ Publishing Group, and Begell House Inc. The most occurring keywords are "acceptability", "minitablets", and "medicine".

The outcome of this bibliometric analysis is to offer valuable insights to researchers, funding agencies, and research institutions by highlighting strengths and identifying gaps in the domain of research on minitablets, this study aspires to guide future researchers for making advancement in this domain.

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AUTHORS CONTRIBUTION

All the authors have contributed equally for the preparation of this article.

CONFLICT OF INTEREST

The authors declare no potential conflicts of interest to the respect to the review research, authorship and/or publication of this article.

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