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Interpersonal Education in Medical Students: A Bibliometric Analysis From 2014 to 2024

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ABSTRACT

Introduction: The urgency to set a new strategy at teaching and learning that improve healthcare quality based on collaborative work among different professionals, interprofessional education becomes an emerging topic, being considered an important approach in health curriculum. The aim of the study is to investigate the research hotspots and theme trends in Interprofessional education in medical student through bibliometric analysis.

Methods: Relevant articles on Interprofessional education in medical student published between 2014 and 2024 were retrieved from SCOPUS. The VOSviewer was used to extract and quantitatively analyze the publications data in three dimensions such as network, overlay and density visualization.

Result: A total a total of 1702 publications which we limit to those published within the year of 2014-2024 and 512 publications met all of the requirements. Afterwards, co- occurrence analysis was conducted and a network map was also developed using VOSviewer tool. The results showed the trend based on the annual number of publications; most contributing authors; most contributing countries; most published journals; keyword analyses; gaps and potential future study topics.

Conclusion: This study demonstrated the publication trends regarding the implementation of interprofessional education in medical student over the past 10 years. The analysis results using VOSviewer showed that there are still some topics about interprofessional education that need to be explored in the future.

Keywords: Interprofessional education; medical student; Bibliometric



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Introduction

Continuous improvement in technology and treatment modalities makes the health care sector a complex environment, and all healthcare professionals need to keep up with new advancements to ensure positive health outcomes for individuals and families. To achieve this objective, all health professionals, regardless of their discipline, need to practice collaboratively. Various models of interprofessional education (IPE) exist, and academics must include these models and frameworks in undergraduate education to prepare students for interprofessional collaborative practice in the health care environment.¹ Currently, various accrediting bodies, standards, and guidelines require health professionals to promote IPE in undergraduate education. IPE is promoted in pharmacy, dentistry, medicine, nursing, and other allied health professions.² The Center for Advancement of IPE (CAIPE) defines IPE as “a teaching and learning process that fosters collaborative work and improves quality of care between two or more professions. IPE occurs when students learn with, from, and about one another”.³

This definition has also been adopted by the Canadian Interprofessional Health Collaborative (CIHC) and seems to be the most widely accepted definition.⁴ The CIHC adds that IPE occurs when health care professionals learn collaboratively within and across disciplines to acquire knowledge, skills, and values needed for working in teams. Considering this context and aiming at teaching and learning strategies that improve healthcare quality based on collaborative work among different professionals, interprofessional education becomes an emerging topic, being considered an important pedagogical approach in health curricula. Today, we can see that ASEAN's countries are trying to apply the concept of IPE in their medical and health science education. Even a country like Singapore already had a well maintained IPE's program and creating a sustainable IPE's platform for Asian university.⁵ Narrowing the area into Indonesia, several journals were reporting the implementation of IPE in medical and health science curricula, assessing the outcomes and deliver some suggestion for that.

We undertook a bibliometric analysis of Interprofessional Education in Medical Student. The aims of this study are to review interprofessional education literature by providing a thorough bibliometric analysis to investigate the trend based on the annual number of publications; most contributing authors; most contributing countries; most published journals; keyword analyses; gaps and potential future study topics; Additionally, this study aims to provide a comprehensive description of the current state of knowledge in the field of interprofessional education.

Methods

This is a bibliometric study on the topic. The implementation of Interprofessional Education in Medical Student. The bibliometric method is a useful approach to identify the emerging trends and abrupt changes in a research field. It contains a series of quantitative methods to study academic literature and develop the distribution patterns or internal relationship of a specific topic, field, institute, or country.⁶

SCOPUS is one of the most authoritative data bases used in bibliometric studies. Scopus is among the available databases with the broadest worldwide coverage of publications including journals, books, and conferences, as well as articles.⁷ Scopus is also user-friendly and supports multiple software packages for obtaining bibliometric information (authors, titles, publication dates, references, abstracts, institutions, and countries).⁸

SCOPUS is more effective to analyze the overall development of a research field. Based on this, we choose SCOPUS to conduct our research. The main purpose of this study is to investigate the emerging trends of the search of interprofessional education in medical education. The data used in the present study are downloaded from SCOPUS on 15 May 2024 using keyword "Interprofessional education" AND "medical education" OR "medical student".

The initial search of keyword showed a total of 1702 publications which we limit to those published within the year of 2014-2024, published in subject area of medicine, document type of article, keyword limit of medical education and medical student and publications published using English language and 512 publications met all of the requirements. Afterwards, co-occurrence analysis was conducted and a network map was also developed using VOSviewer tool. VOSviewer is chosen to perform the results of the analysis because of its outstanding analytics and visualization capabilities as well as its free access.

In this study, the VOSviewer was employed to visually analyze co-occurrence patterns, with circles representing the breakdown of countries and author keywords. The distance between two circles indicated the strength of the relationship between terms, with greater distance suggesting a weaker relationship. Various colors in the visualization denoted different term clusters, while the size of the circles was proportional with the frequency of terms. Additionally, the line thickness corresponded to the strength of the relationship between terms. The higher the diameter of the circle, the greater the frequency of the terms. The flow of the data search strategy as well as its analysis are depicted in FIGURE 1

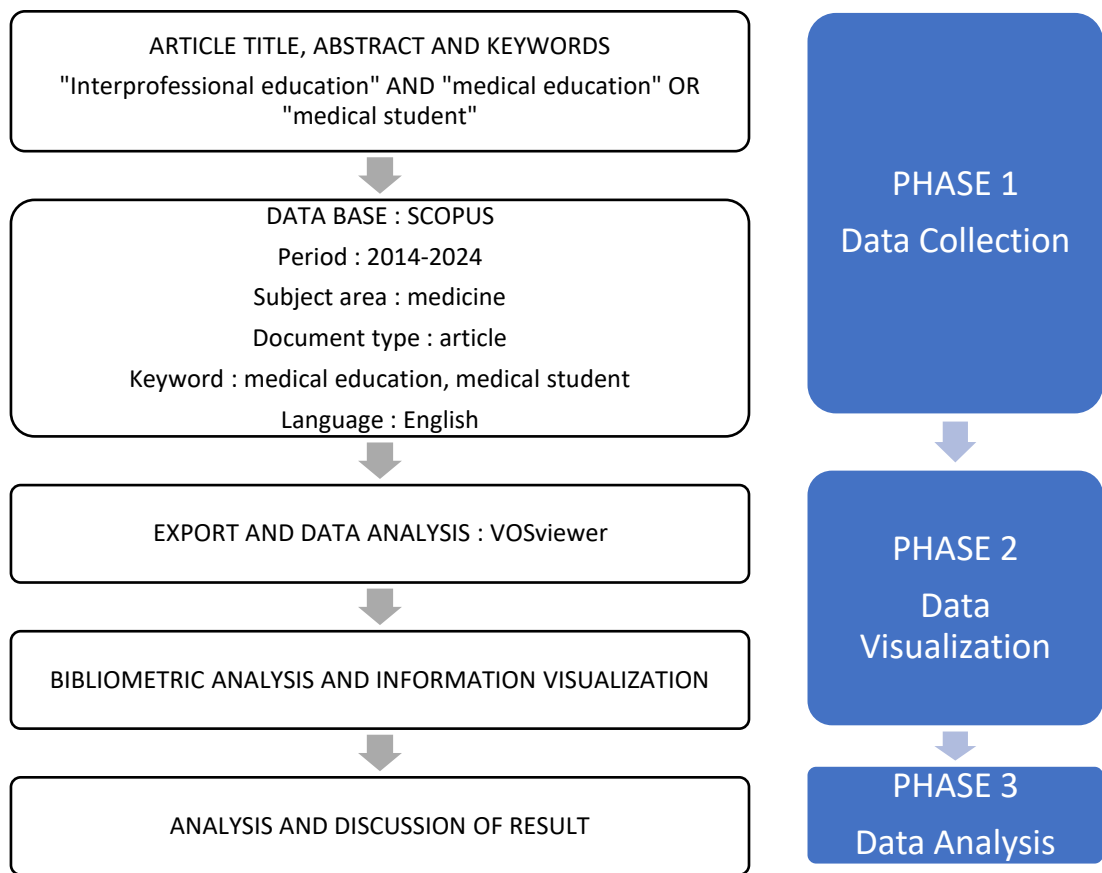


Figure 1. The methodology phases on constructing bibliometric analysis

Result
Publication Trends

The publication trends showed in Figure 2. A decline was observed from 2015 and 2018; then an upward trend was observed from 2018 to 2020; this period may have been associated with increased awareness, research funding, and the global issues of interprofessional education. During 2020 and 2021 there is a slight decline observed that may have been associated with COVID-19 pandemic then stagnant result observed in 2022 and 2023. At this time this study was conducted, 2024 was still in progress so the number of publications for that year may have decreased from 2023.

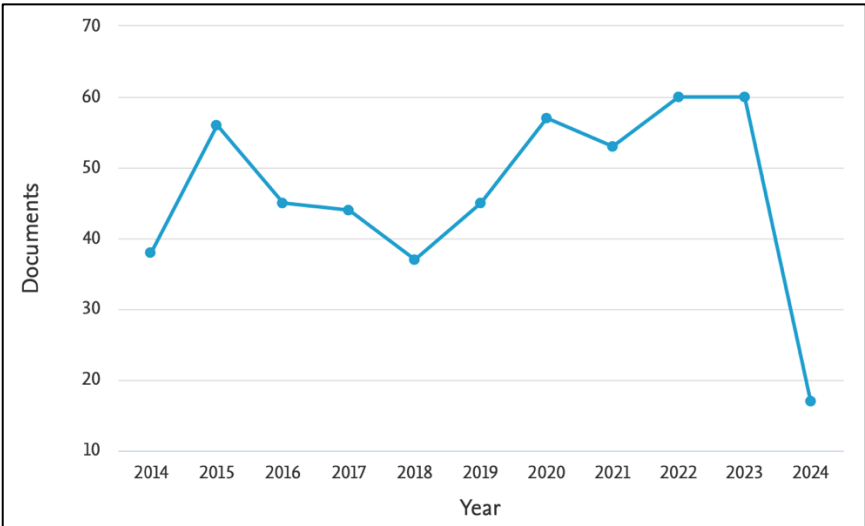


Figure 2. Interprofessional Education research trends on a world-wide scale (2014-2024)

Based on the most contributing authors, Mahler C from Universitätsklinikum Tübingen, Abteilung Pflegewissenschaft, Tübingen, Germany is the author with the most contributions with 6 articles and a total of 144 citations. His most influential article is about “Position statement GMA committee – “interprofessional education for the health care professions” in 2015 with 83 citations, while his current publication is “Interprofessional socialization and collaboration on an interprofessional training ward – a reconstructive analysis” in 2022 with 3 citations. **Figure 3** shows the top ten contributors of articles published in SCOPUS regarding Interprofessional Education in Medical Student.



Figure 3. Authors’ production on Interprofessional education research

As shown in Figure 4, the top 5 journals that published the most articles in the field of Interprofessional education in medical student over the past 10 years. Journal of interprofessional Care published 120 articles, followed by Mededportal the Journal of Teaching and Learning Resources published 26 articles then Anatomical Sciences Education published 12 articles.

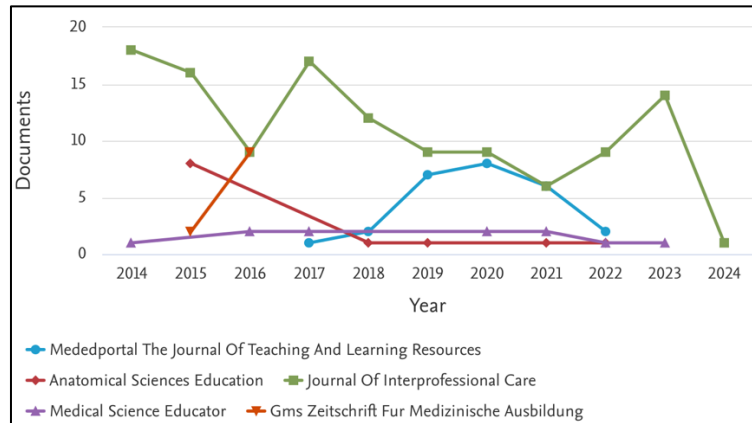


Figure 4. Journals published articles in the field of Interprofessional education

The top ten countries based on publication number in the field of Interprofessional Education in Medical Student are presented in Figure 5. United States published the most documents concerning Interprofessional education, with 257 publications (50,19%), followed by United Kingdom with 53 (10,35%), and Italy in the 10th positions with 6 publications (1,1%).

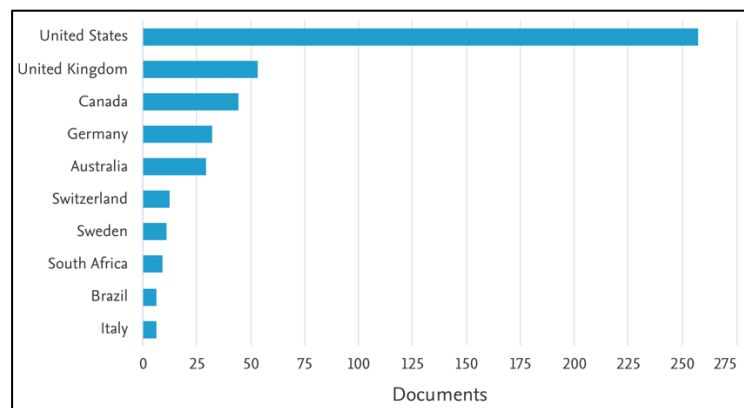


Figure 5. Countries based on publication number in the field of Interprofessional Education

Based on the bibliographic information, we retrieved the results using VOSviewer and set the minimum keyword frequency at 5. We collected 1170 keywords and 55 meet the threshold. Table 1 shows seven clusters and their linkages among examined areas. Each cluster consisted of numerous keywords including the most frequent keywords and the number of occurrences from the bibliometric analysis with VOSviewer. In figure 6, showed the network visualization where VOSviewer's default labelling and depiction of Interprofessional Education in Medical Student study topic-related objects (keywords) are circles; the size of the label and the circle of an item is determined by the weight of the item. The higher the weight of an item, the larger the label and the circle of the item. The color of an item is determined by the cluster to which the item belongs. Lines between items represent links. The distance between two journals in the visualization approximately indicates the relatedness of the journals in terms of co-citation links. In general, the closer two journals are located to each other, the stronger their relatedness. The strongest co-citation links between journals are also represented by lines.



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Thus, the keyword with the lowest frequency, represented by a diffuse hue, indicates that the research topic is yet underdeveloped and requires additional exploration in the future studies. In this study, the underdeveloped topics were health equity, qualitative research, quantitative, diversity, pharmacy. These underexplored areas give opportunity to the new researchers to contribute to the development of interprofessional education in medical student.

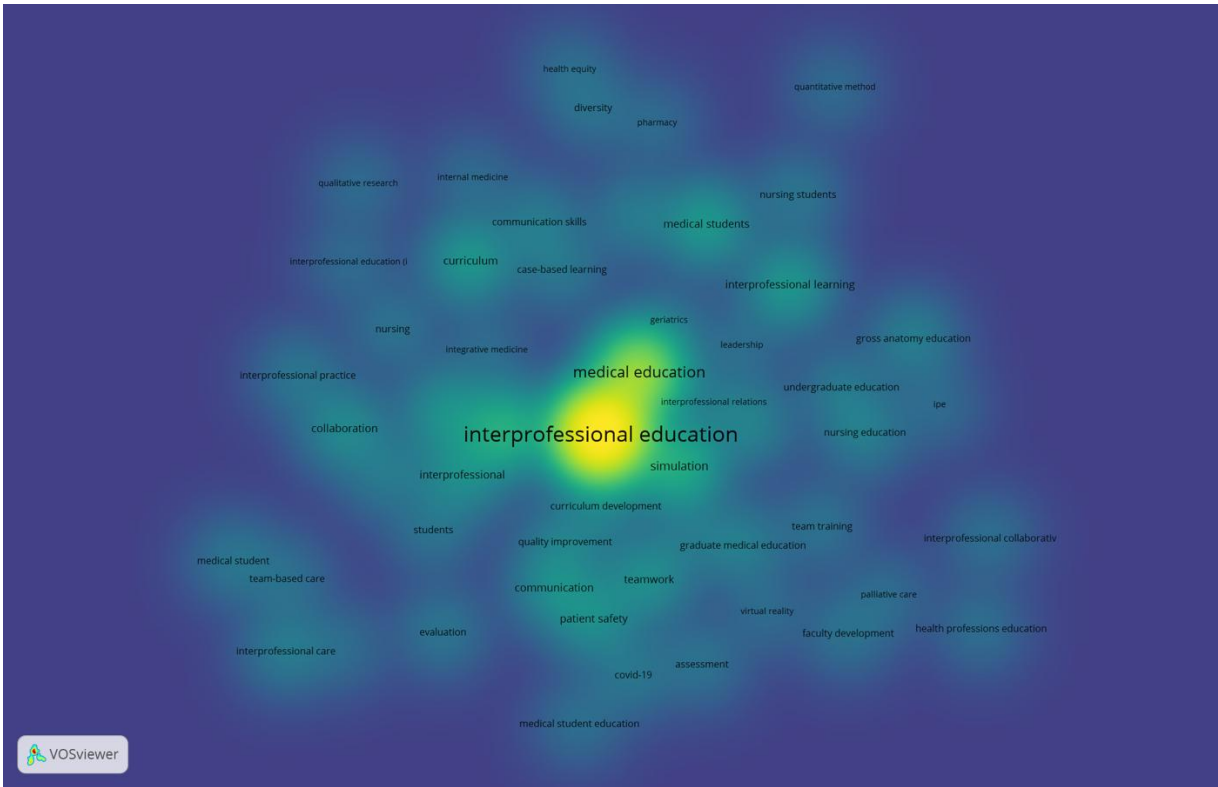


Figure 8. Density visualization of Interprofessional education-related publications

Table 1. The result of cluster analysis on Interprofessional education publications

Cluster	More frequent keywords	Keywords (Number of Occurrence)
1 st cluster (10 items)	Simulation (38), interprofessional (17), patient safety (17)	Communication (16), graduate medical education (11), quality improvement (10), covid-19 (8), team training (7), interprofessional communication (6), virtual reality (5)
2 nd cluster (10 items)	interprofessional education (297), interprofessional collaboration (41), Collaboration (16)	interprofessional care (10) mixed methods (9) evaluation (8) interprofessional practice (8) medical student (8) team-based care (6) interprofessional evaluation (5)
3 rd cluster (8 items)	Undergraduate medical education (12) primary care (10) curriculum development (9)	medical student education (6), geriatrics (5) integrative medicine (5) interprofessional relations (5) pharmacy (5)
4 th cluster (8 items)	medical students (24) interprofessional (23) gross anatomy education (11)	nursing education (11) nursing education (8) undergraduate education(8) IPE(5) quantitative method (5)
5 th cluster (7 items)	medical education (109) curriculum (23) education (19)	Nursing (7) Students (7) Interprofessional education (ipe) (5) qualitative research (5)

6th cluster (6 items)	communication skills (10) case-based learning (8) diversity (6)	health equity (5) internal medicine (5) leadership (5)
7th cluster (6 items)	Teamwork (18) Assement (7) faculty development (7)	health professions education interprofessional (6) collaborative practice (6) palliative care (5)

Discussion

This study was primarily aimed to explore the current status, research hotspots, and theme trends of interprofessional education in medical student from 2014 to 2024. A total 512 publications originating from SCOPUS were analyzed in this study. An increasing number and trends of publications were observed on this topic, especially from 2018 to 2020. The VOSviewer analysis yielded 7 clusters. These might be the candidate topics for future in-depth research.

The first cluster with “simulation”, “interprofessional” and “patient safety” as the most frequent keywords. In 2013, WHO guidelines highlighted the necessity to employ IPE and simulation together in professional healthcare education to address issues related to collaboration and communication, improve patient safety and promote positive patient outcomes.⁹

Recent studies have revealed an increasing trend in the use of interprofessional simulation in different health care undergraduate students and professional staff.^{10, 11, 12}

A recent systematic review and meta-analysis have shown that interprofessional simulation is an effective learning method to improve the collaborative competencies of the participants.¹³ However, there are still measurable gaps in this field. The lack of randomized clinical trial studies, inadequate sample sizes, and varied content and structural scales may yield a high risk of bias and low-quality evidence.

The second cluster focuses on collaboration in interprofessional education. Delivery of quality health care is likewise a function of effective teamwork among individuals providing care. Respect, understanding, and collaboration across professions are key components to successful health care teams. In order for health care organizations to uphold a collaborative environment, understanding the attitudes and collaborative competencies of health care professionals is a necessary first step. Additionally, understanding characteristics related to the type and amount of IPE health care professionals complete is imperative in order to design effective IPE experiences.¹⁴ The third cluster mostly talked about undergraduate medical education. In most parts of the world, educational activities for every profession at the undergraduate level are performed independently from one another (i.e., each profession plans and conducts its own teaching). As a result, graduates have limited knowledge about other professions, limited communication, collaboration, and teamwork skills and must wait until they enter an actual work environment before they can interact with other professions.¹⁵ Therefore Interprofessional education need to be implemented in undergraduate curricula.

This bibliometric analysis' findings have also shown that there are still some topics about interprofessional education that need to be explored in the future such as health equity, the need of qualitative or quantitative study to measure the impact of interprofessional education, and also research focuses on pharmacy.

Conclusion

This study demonstrated the publications trends and listed the most influential countries, journals and authors regarding the implementation of interprofessional education in medical student over the past 10 years. Using the VOSviewer analyses, we identified the network, overlay and density visualization of the publications found on SCOPUS. The result showed that there are still some topics about interprofessional education that need to be explored in the future. research question, and not expressed in statistical sentences. Use terms with substantive scientific meaning and avoid statistical/methodological technical terms.

Conflicts of Interest

There is no conflict of interest.

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