# SIMULATION IN EDUCATION OF HEALTH PROFESSIONS: A DESCRIPTIVE ANALYSIS THROUGH BIBLIOMETRICS

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## Abstract

Introduction and Objectives: Simulation-based training has been defined as the use of a person, device, or set of conditions to present and evaluate problems authentically that can be applied to many different disciplines and types of trainees. The usage of simulation, in Health professions practice and education, is still growing, with a possible impact also on research. However, the increase in the number of scientific publications makes it difficult to know the scientific structure and development of this field. Visualization techniques based on bibliometric data are useful for the understanding of scientific fields.

Material and Methods: This is a bibliometric, descriptive, and retrospective study. The author identified publications from the Pubmed database from 2000 till 2022 related to the use of Simulation in Health Professions Education using this search string ("Teaching"[Mesh] OR "education" [Subheading] OR "Education"[Mesh]) AND ("Patient Simulation"[Mesh] OR "Computer Simulation"[Mesh] OR "Simulation Training"[Mesh] OR "High Fidelity Simulation Training"[Mesh]). From the titles and abstracts of these publications, was selected the main terms related to the field, extracted by VOSviewer software, to create a visualization of the most important trends referred to in the literature.

Results: The author identify 2,212 eligible references (1,825 Clinical trials and Randomized Controlled Trials and 389 Meta-Analysis and Systematic Reviews). Upon analysing the co-occurrence of the Mesh terms associated with simulation and education, the most common one was the usage of this approach in different areas and education levels in the medical profession followed by nursing and allied health. It was noticeable also in the emergence after 2017 of the use of this strategy with nursing students.

Conclusions: In overall, as shown by the published research, the interest in simulation has grown exponential, influencing all aspects related to the use of this approach in the education and training of Health Professions. As the global need for health care continues to grow, many challenges to clinical training remain unaddressed. Patient and context simulation has the potential to address these challenges using local and online available resources. Despite the growing evidence of simulation applied to the context of health professions education, integration of this approach into the academic curriculum is still slow because of various interrelated human, organizational and technical challenges

Keywords: Simulation, Health Professions, Bibliometrics.

## 1 INTRODUCTION

Simulation-based training has been defined as the use of a person, device, or set of conditions to present and evaluate problems authentically that can be applied to many different disciplines and types of trainees. Simulation is a valuable tool in the education and training of health professionals and can take many forms, including high-fidelity simulations that mimic real-life scenarios as closely as possible, and low-fidelity simulations that use simple, cost-effective techniques to teach basic skills.

One of the main benefits of using simulation in health professions education is that it allows students to make mistakes and learn from them without causing harm to real patients. This is especially important for procedures or interventions that may have significant risks or consequences if performed incorrectly. Simulation allows students to practice and refine their skills until they are proficient, which can increase their confidence and competence when working with real patients. Simulation can also be used to teach communication and teamwork skills, which are essential in the healthcare setting [1]. By participating in simulated scenarios, students can learn how to effectively communicate with patients and other healthcare professionals, and how to work effectively as part of a team.

Simulation is a tool that is increasingly being used in the education and training of health professionals to provide experiential learning opportunities that are safe, controlled, and low stakes[2]. There are several ways in which simulation can be used in the education and training of health professions, including:

- Skill acquisition and practice: Simulation can be used to help students and trainees learn and practice clinical skills, such as taking vital signs, administering medications, or performing procedures.
- Team training: Simulation can be used to train health professionals to work effectively in interprofessional teams. This can involve simulations of patient care scenarios, where students and trainees practice communication, coordination, and teamwork.
- Emergency response training: Simulation can be used to train health professionals to respond to emergencies, such as cardiac arrest, respiratory distress, or trauma. This can help students and trainees develop the skills and confidence they need to handle real-life emergencies.
- Decision-making and problem-solving: Simulation can be used to help students and trainees practice making clinical decisions and solving problems under simulated conditions. This can involve simulations of patient cases or scenarios where students must diagnose and treat simulated patients.
- Communication training: Simulation can be used to help students and trainees practice communicating with patients and families, including explaining diagnoses, treatments, and prognoses.

Overall, simulation is an important tool in the education and training of health professionals because it allows students to practice and develop their skills in a safe, controlled environment, which can ultimately lead to better patient care.

The usage of simulation, in Health professions practice and education, is still growing, with a possible impact also on research. However, the increase in the number of scientific publications makes it difficult to know the scientific structure and development of this field. Visualization techniques based on bibliometric data are useful for the understanding of scientific fields [3].

Bibliometrics is the study of patterns and trends in research literature. It involves the use of statistical and mathematical methods to analyse and measure the impact of research papers and other scholarly works. Bibliometric studies are often used to evaluate the productivity and impact of research in a particular field or institution, and may be used to inform decisions about funding, hiring, and promotion.

There are several different metrics that may be used in bibliometric studies, including:

- Citation count: This is a measure of the number of times a particular paper has been cited by other papers.
- Impact factor: This is a measure of the average number of citations received by papers published in a particular journal.
- H-index: This is a measure of an author's productivity and impact, based on the number of papers they have published and the number of citations those papers have received.
- Co-citation analysis: This involves analysing the patterns of co-citation (i.e., papers that are cited together) to identify key research areas and trends.

Bibliometric studies can be useful for several purposes, such as identifying influential research in a particular field, identifying gaps in the research literature, and evaluating the impact of research funding. However, it is important to note that bibliometric measures are only one way to evaluate research and should be used in conjunction with other methods.

## 2 METHODOLOGY

The author performed a bibliometric, descriptive, and retrospective study. The author identified publications from the Pubmed database from 2000 till 2022 related to the use of Simulation in Health Professions Education using this search string ("Teaching"[Mesh] OR "education" [Subheading] OR "Education"[Mesh]) AND ("Patient Simulation"[Mesh] OR "Computer Simulation"[Mesh] OR "Simulation Training"[Mesh] OR "High Fidelity Simulation Training"[Mesh]).

From the titles and abstracts of these publications, was selected the main terms related to the field, extracted by VOSviewer software, to create a visualization of the most important trends referred to in the literature.

## 3 RESULTS

The author identified 2,212 eligible references (1,825 Clinical trials and Randomized Controlled Trials and 389 Meta-Analysis and Systematic Reviews) (Fig.1).

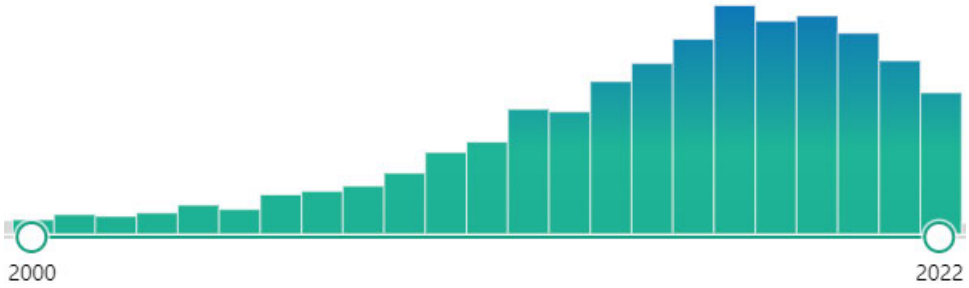


*Figure 1. Publications identified in Pubmed database from 2000 till 2022*

Upon analysing the co-occurrence of the terms associated with simulation and education, the most common one was the usage of this approach in different areas and education levels in the medical profession followed by nursing and allied health (Fig.2). It was noticeable also in the emergence after 2017 of the use of this strategy with nursing students (Fig.3).

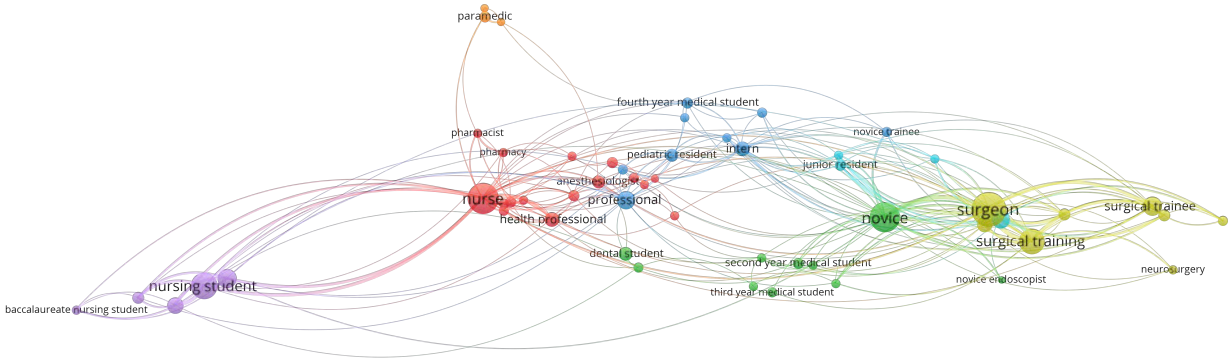


*Figure 2. Co-occurrence of the terms associated with simulation and professions (VOSviewer)*

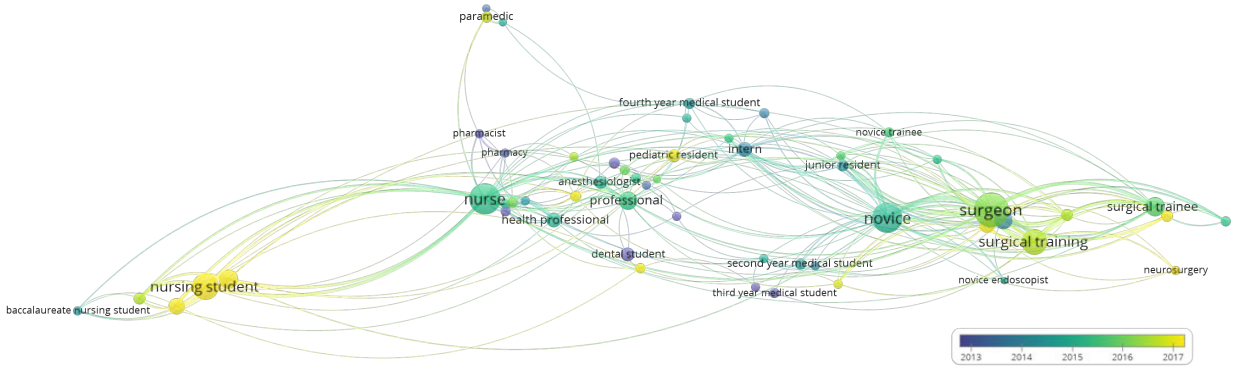


*Figure 3. Co-occurrence of the terms associated with simulation and professions trough time (VOSviewer)*

## 4 CONCLUSIONS

Overall, as shown by the published research, the interest in simulation as a method of education and training for health professions has grown exponentially in recent years. This is due in part to the numerous benefits that simulation-based training can offer, such as providing a safe and controlled environment for students to practice their skills, as well as allowing for the inclusion of a wide range of patient scenarios and contexts.

However, as the global need for healthcare continues to grow, many challenges to clinical training remain unaddressed. Patient and context simulation has the potential to address these challenges, by providing students with the opportunity to practice in a simulated environment, using local and online available resources. This approach can also provide a more cost-effective and efficient means of training, as it does not require access to real patients or the use of expensive equipment.

Despite the growing evidence of simulation applied to the context of health professions education, integration of this approach into the academic curriculum is still slow. This is due to various interrelated human, organizational, and technical challenges. Some of these include the lack of understanding of the benefits and potential of simulation-based training, the lack of resources, and the lack of qualified personnel to develop and implement simulation-based training programs. Additionally, there is also a need to ensure that the simulation-based training is aligned with the current healthcare policies, as well as the need to evaluate the effectiveness of simulation-based training in improving the quality of care.

Overall, simulation-based training has the potential to revolutionize the education and training of health professionals, by providing them with the opportunity to practice in a safe and controlled environment and to address the challenges that remain unaddressed in clinical training. However, it is important to overcome the human, organizational, and technical challenges that prevent the integration of simulation-based training into the academic curriculum.

## REFERENCES


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