

Teaching, learning and assessment of professionalism in medical education: A citation-based systematic review of literature

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Abstract

Background: Professionalism is an important competence in medical practice, yet a complex area. We describe the landscape of published articles on teaching, learning and assessment of professionalism in medical schools. This study aims to review the temporal trend of literature published and cited on the subject, and includes frequently publishing authors, journals, and network analysis. The study further aims to present the themes of the most commonly cited articles.

Methods: A systematic review of peer-reviewed literature was carried out to describe the current patterns of research in professionalism using the terms "professionalism" AND "medical education" OR "medical college" OR "medical school". The title and abstract of the selected documents were skimmed to include only relevant articles. 'Relevant' articles were defined as articles describing teaching, learning or assessment of professionalism in undergraduate medical curricula. Articles describing professionalism, but not directly related to teaching, learning and assessment were excluded.

Results: Over the study period spanning from 1973 to 2020, a total of 1053 articles were identified as relevant. A surge in the number of publications was observed from the year 2000. Over 400 articles were published in 5 leading journals in medical education. Of the 50 top-cited papers, 18 (36%) articles explored opinions of stake holders through questionnaires and surveys about different aspects of professionalism, there were 13 (26%) 'Commentary' and 7 (14%) review articles. The primary objectives of more than 50% of the top-cited articles were assessment methods (14%), teaching by humiliation (14%), personal identity formation (8%), barriers to professionalism (8%), and teaching ethics (8%) and empathy (8%).

Conclusions: We describe the landscape of published articles on teaching, learning and assessment of professionalism in undergraduate medical schools. The surge in publications since 2000, top publishing journals and frequently publishing authors were identified. Of the most cited articles, assessment methods, personal identity formation, and teaching empathy and ethics predominate as the main themes.

Keywords: Professionalism; Teaching; Learning; Assessment; Medical Education; Curriculum; Systematic Review; Oman; Undergraduate medical student

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1 Introduction

Medical practice is evolving continuously and the importance of a ‘competent’ doctor is recognized more than ever before. Competency of a medical graduate extends beyond being a ‘clinical expert’, and includes effective communication and counseling, life-long learning, scholarly activities, managerial capabilities and professionalism (ACGME, CanMed, Tomorrow’s Doctor). Like any other competency, instilling professionalism requires formal teaching and assessment (1). Medical education recognizes the importance of teaching and assessing professionalism to medical students (2). Professionalism is a complex subject, and there are several definitions of professionalism in medical practice. Educators and regulatory bodies alike, continue to define professionalism in medical practice. Whereas, humanism is a core element of professionalism (3), the boundaries of professionalism extend far beyond, and include behaving according to the standards of acceptable medical practice, and being accountable to patients and the community the physician serves. Hence, different strategies to teach and assess professionalism in educational environment have been described; however, optimum strategy or the mix of methods continues to be explored (4).

There are several systematic reviews on teaching and assessing professionalism for medical students (5-10). These reviews have reported in detail the definition of professionalism (6), discussed the role of teaching empathy (9), described professional identity formation (10); and reviewed the assessment methods (5, 6, 8). There is one citation-based literature review discussing negative aspects of the medical school learning environment, including professionalism as one of the aspects (11). There was a need to review the overall literature related to teaching, learning and assessment of professionalism for undergraduate medical students.

The current study is an attempt to describe the landscape of published articles on teaching, learning and assessment of professionalism in medical schools. This study aims to review the temporal trend of literature published and cited on the subject, and includes frequently publishing authors, journals, and network analysis. The study further aims to present the themes of the most commonly cited articles.

2 Method

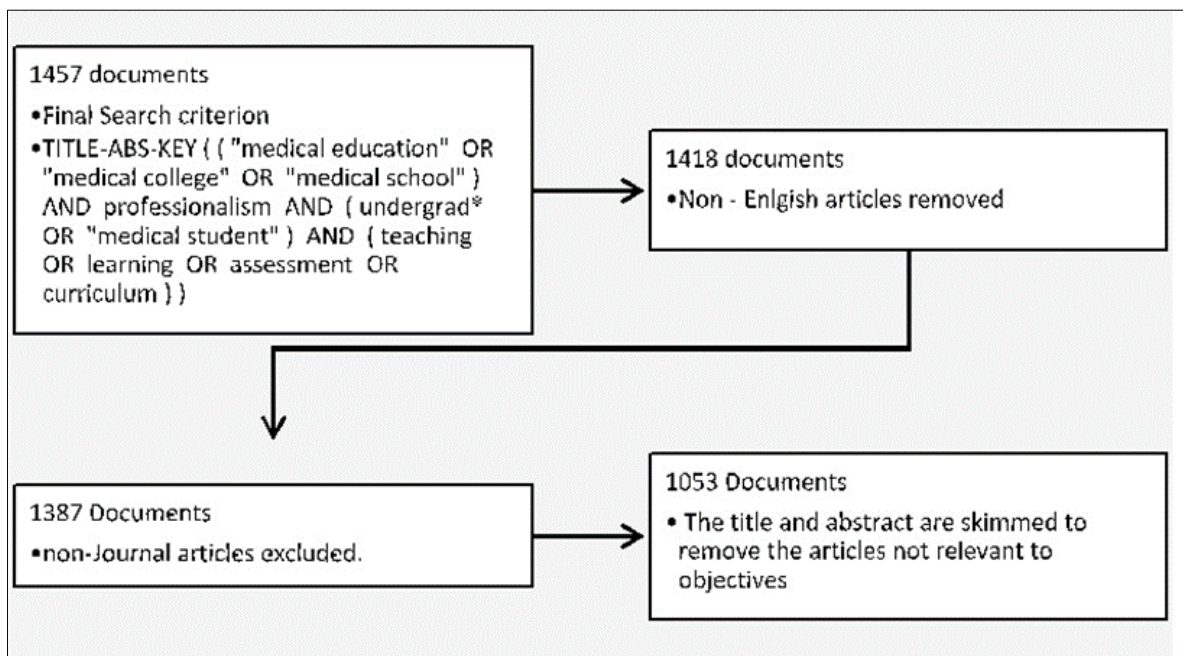


Figure 1 Article selection process, only English articles selected based on final search criterion

A systematic review of peer-reviewed literature was carried out to describe the current patterns of research on teaching, learning and assessment of professionalism in undergraduate medical education. Relevant articles were identified using the SCOPUS database. The initial search was done on April 7, 2021, using the terms “professionalism” AND “medical education” OR “medical college” OR “medical school” in either the title, the abstract or keywords. To restrict articles only for undergraduate level, keywords “undergrad” or “medical student” were added. Keywords

“teaching” OR “learning” OR “assessment” OR “curriculum” were added in the next step. The search yielded a total of 1,457 articles published over a period spanning from 1973 to 2020.

Thirty-nine articles written in languages other than English were excluded. The search was then restricted to articles published in peer-reviewed journals, leaving a total of 1387 articles. At this stage, the title and abstract of the selected documents were skimmed manually by two independent researchers to include only relevant articles. ‘Relevant’ articles were defined as articles describing teaching, learning or assessment of professionalism in undergraduate medical curricula. Articles describing professionalism, but not directly related to teaching, learning and assessment were excluded. Also, articles related to professionalism in medical practice, continuing, medical education and postgraduate residency programs exclusively were also excluded. Selection methods of relevant articles are shown in figure 1.

3 Results

Over the study period spanning 47 years, a total of 1053 journal articles, published in 270 journals were identified. Almost 15% (155/1053) articles were published by a single author, and the average number of authors per article were 3.36.

3.1 Publication and Citation Trend

The trends of publication and citations over the study period are shown in figure 2A. An increase in the number of published articles was observed after year 2000, however, it was only after 2003, that the number of yearly publications started to increase sharply, and in the last 5 years, 60-80 publications appeared in indexed journals.

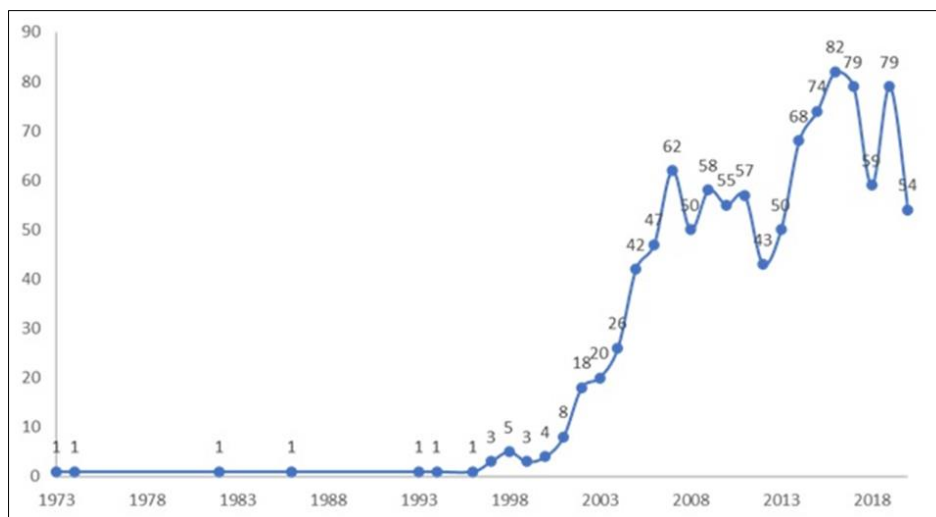


Figure 2A Temporal trends of publications selected from 1973-2018 most influential journals

The number of citations also increased progressively over the years. Few publications deserve special mention. The earliest in the series is a presidential address by John Stokes to the Australian Medical Association; published in the Medical Journal of Australia (12). Although, the paper received few citations, it is the earliest publication to define professionalism in medicine, and highlighted the need to teach professionalism. Stokes distinguished the profession of medicine by laying down the criterion of professionalism; a combination of learning which embodies in it *something more* than the traditional knowledge and skills, and the ‘equally important’ provision of service to the humanity. One of the earliest papers to receive multiple citations aimed to study the role of clinical training environment in reaffirming medical professionalism among physicians-in-training and the faculty (13). Published studies till that time revealed that economics of healthcare, faculty reward systems, and specialization in medicine undermined teaching of professionalism in medical schools and argued for a system with core teaching faculty, creation of mentoring and role modeling programs, and implementation of a longitudinal curriculum to reaffirm professionalism in medicine. Swick, Szenas (14) published a brief report on a 2-stage survey from 125 medical schools in the US to determine whether and how teaching professionalism was incorporated in undergraduate medical curricula. At the time most medical schools taught professionalism either in a didactic or experiential manner, a wide variation in teaching and assessment of professionalism was observed. This article has received more than 200 citations. Arnold (5) reviewed the professionalism literature published over the previous 30 years. She reviewed the concept of professionalism,

psychometric properties of approach to assess professionalism, and emphasized the need for developing solid tools to assess professionalism. Another article published in the same year (2002) received more than 3,800 citations. The authors reviewed the literature over the previous 35 years, and generated a definition of professional competence, “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served” (6). The authors emphasized the need for assessing clinical reasoning, expert judgment, management of ambiguity, and professionalism, in addition to the basic clinical skills. Dyrbye, Massie (15) reviewed the relationship between measures of professionalism and burnout among US medical students using a cross-sectional survey involving 7 medical schools and 4400 students and concluded that burnout was associated with self-reported unprofessional conduct. Students with burnout reported engaging in more than one unprofessional behavior. The article has received more than 400 citations.

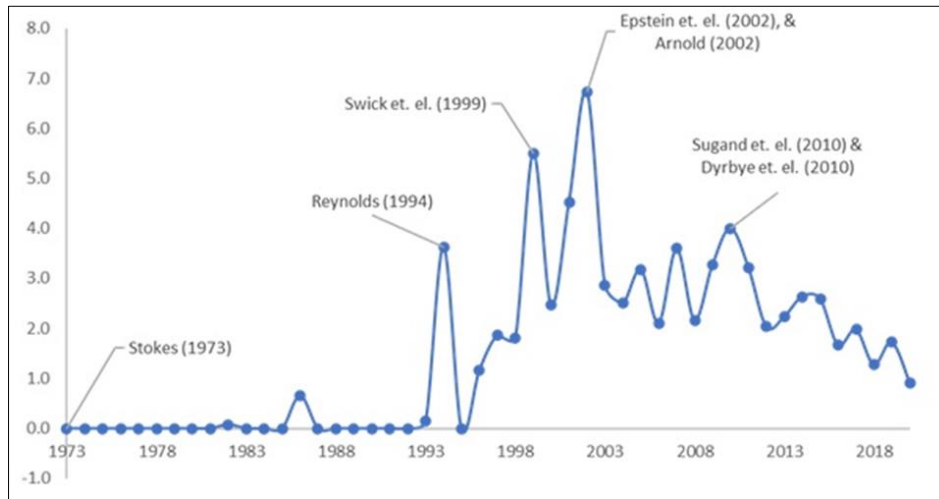


Figure 2B Based on Citation trends selected from 1973-2018

3.2 Core Journals

A total of 5 core journals published 404 articles, another 30 journals published 304 articles, and 235 journals published 345 articles. Figure 3 also shows the distribution of citations received by each of the three zones. Zone 1 journals received 50% of all citations.

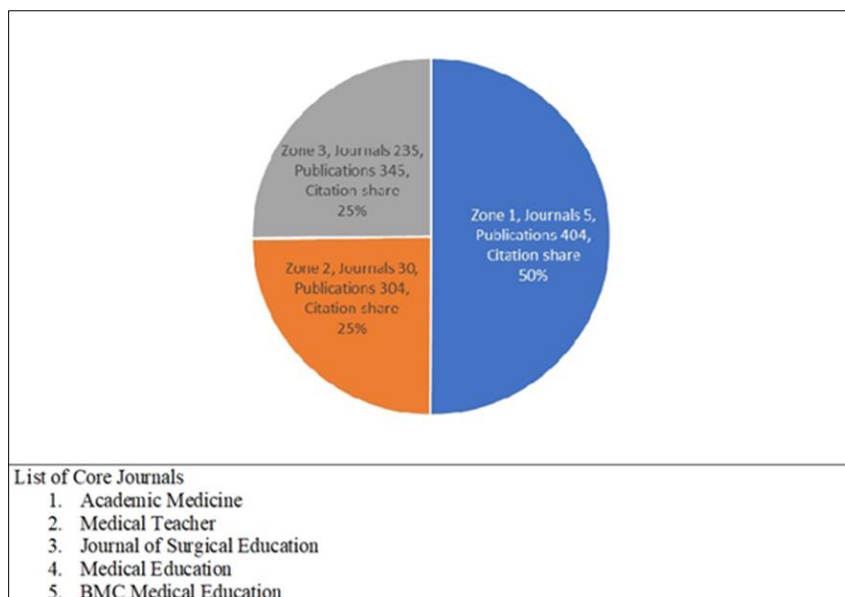


Figure 3A List of core journals, and the Bradford’s law applied to all influential journal, Zone 1 has maximum citation share

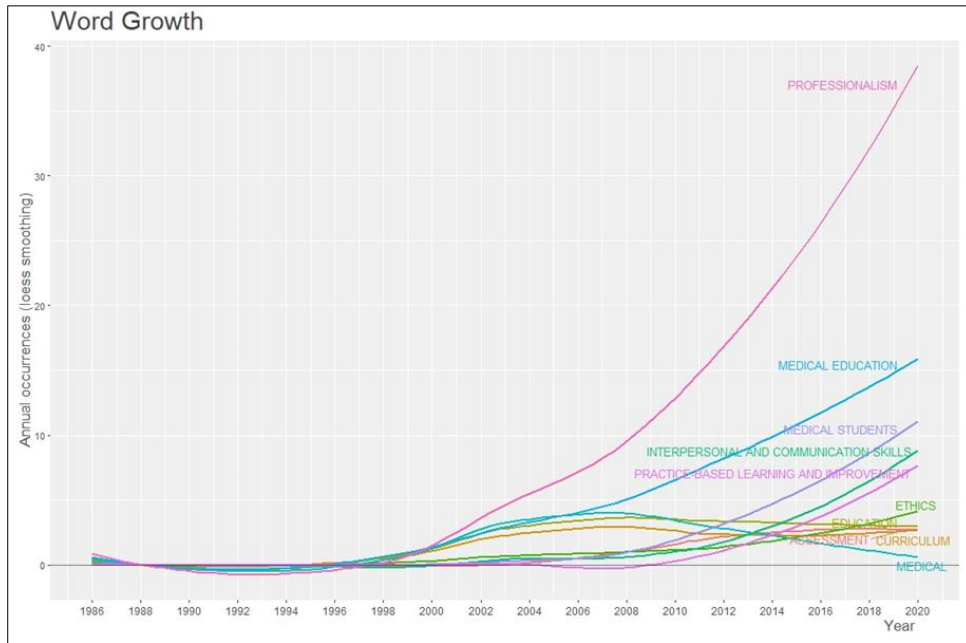


Figure 3B Temporal trends of publication in the 5 most influential journals

We then looked at the source dynamics. Figure 3B shows that of the core journals, ‘Journal of Surgical Education’, and ‘BMC Medical education’ published more articles in the last 5 years, and the numbers continue to increase. The other 3 ‘core journals’ peaked publishing articles on teaching, learning and assessment of professionalism between 2005 and 2015

3.3 Authors Productivity

Figure 4A shows the output of the top 20 authors. At least 13 authors published their work over a period spanning more than 10 years. A couple of authors started to publish after 2015, and are ranked in the top 20 by virtue of the number of publications. It may be argued that professionalism in medical education is an emerging field, Lotka’s law may not depict actual picture.

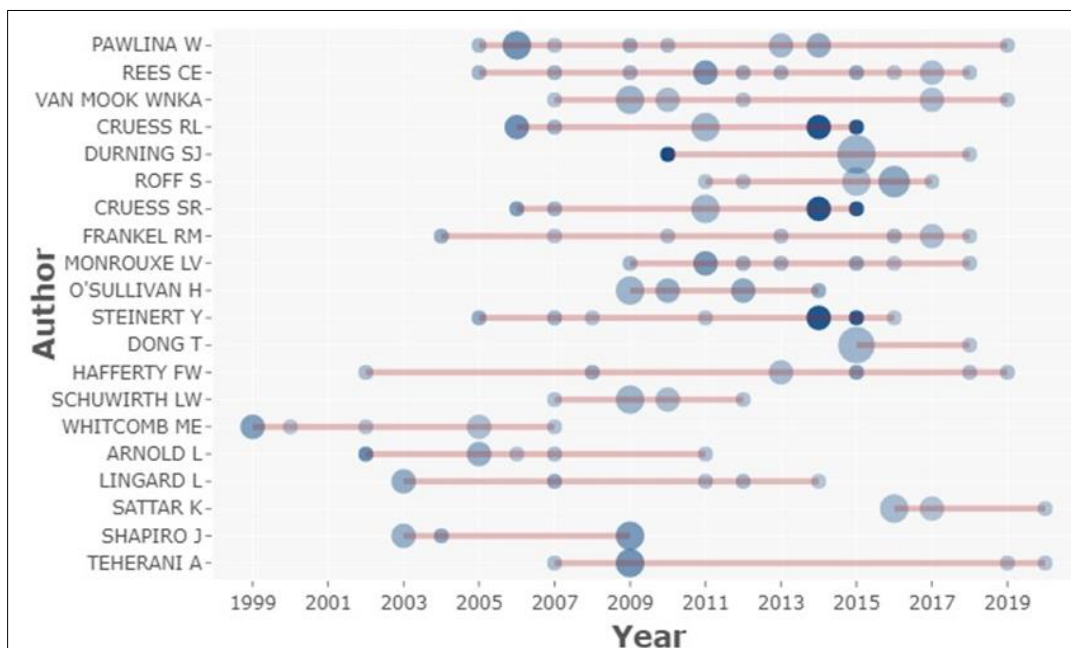


Figure 4A Top 20 authors and the period of publications based on citation publication

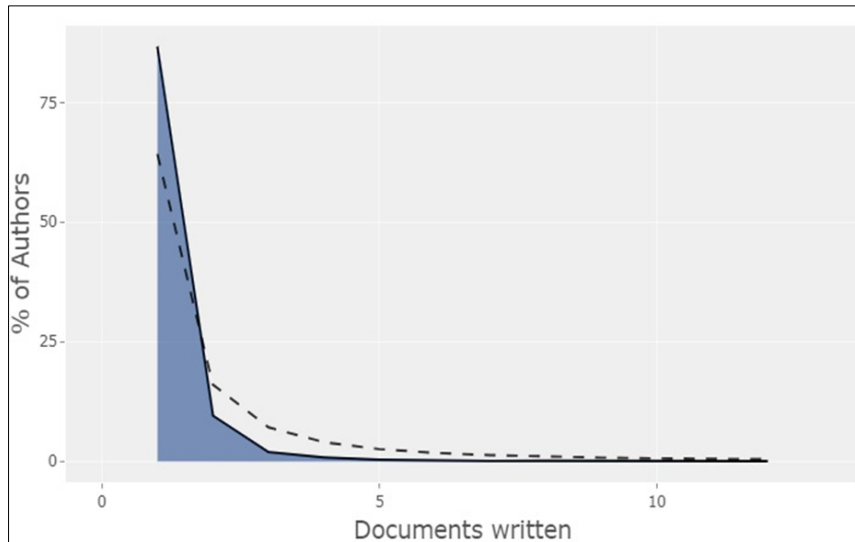


Figure 4B Application of Lotka's law applied number of articles published goodness-of fit tests are available for conformity and testing the validity of data

3.4 Conceptual Structure

3.4.1 Main Themes and Trends

Conceptual structure of an article can be studied using the keywords supplied by the authors. We present the authors' keyword cloud, dynamics, and co-word analysis with the aim to explore the overall conceptual structure of published articles in professionalism and medical education.

3.4.2 Most frequently used keywords

Figure 6A shows the trends of occurrence of the most frequently used author supplied keywords as a word-cloud. As is seen, the most frequent keyword is the term "professionalism" with 329 occurrences, followed by the terms "medical education" (157 occurrences), "medical students" (70 occurrences), "education" (63 occurrences), "medical" (51 occurrences), "curriculum" (49 occurrences), "interpersonal and communication skills" (48 occurrences), "practice-based learning and improvement" (36 occurrences), "assessment" (32 occurrences) and "ethics" (32 occurrences).

3.4.3 Keywords Growth/Trend

Following the trends of keywords over the course of time allows observation about the evolution of terminology, and changes in the conceptual structure of the field. It is interesting to note that whereas, keywords 'medical education', 'medical students', 'interpersonal and communication skills' and 'practice-based learning and improvement' continue to be used more frequently, the term 'professionalism' is the most frequently used keyword, and is used increasingly frequently.

3.4.4 Co-word analysis

We next looked at keyword clusters. Thematic clusters are arrays of terms or combinations of words used in publications on a given topic. This analysis is also called a "co-words network" Callon, Rip (16). Co-word analysis helps in understanding the main themes. The co-word occurrences reveal four main clusters; "professionalism", "medical education", "interpersonal and communication skills" and "curriculum" (Figure 6C). "Professionalism" is used more commonly in connection with "assessment", "medical ethics", and "feedback", professional behavior", and "curriculum development". There is overlap across the four clusters, and this is natural, as these are closely interrelated. For example, "ethics" is used together with the three main themes, professionalism, medical education and curriculum.



Figure 5A Word cloud

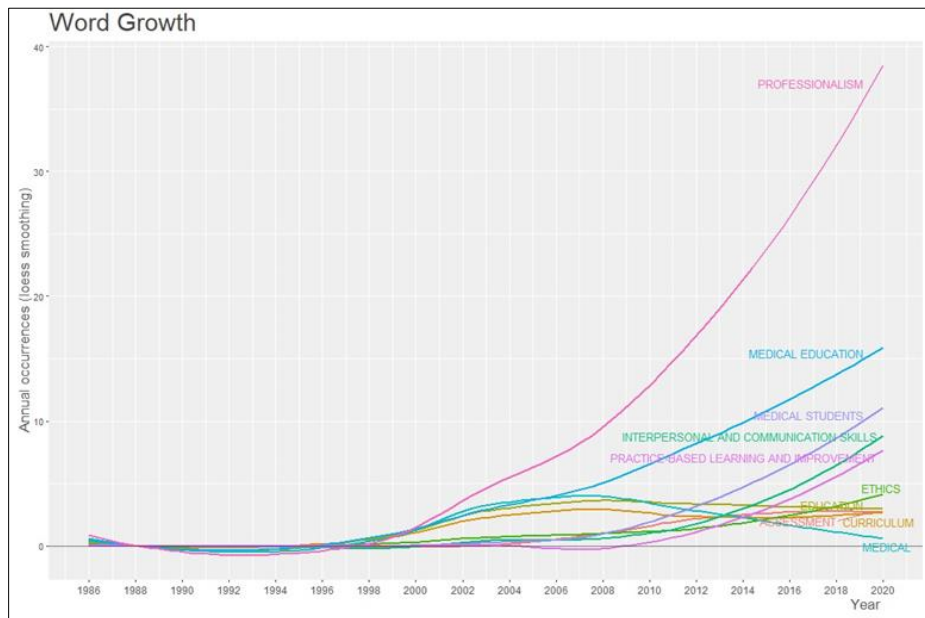


Figure 5B Key-word growth

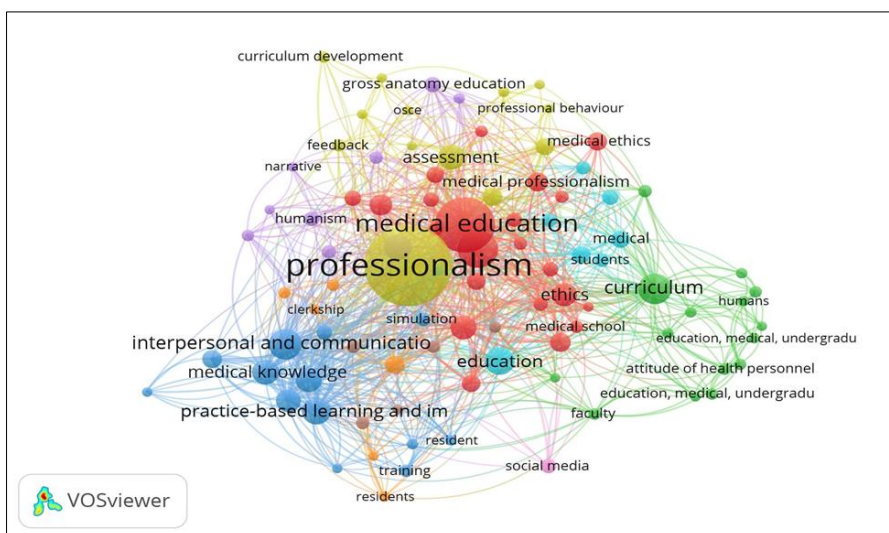


Figure 5C Network analysis

3.5 Most cited articles

The most cited papers were identified and an index was generated by dividing the number of citations by the number of years since publication. Top 50 papers were identified and abstracts were reviewed to study the contents. If abstracts were not informative, entire manuscript was reviewed.

First we looked at the type of publication. Of the 50 top-cited papers, 18 (36%) articles explored opinions of different stake holders through questionnaires and surveys about different aspects of professionalism, there were 13 (26%) 'Commentary' articles (commentary, perspective, editorial etc), and 7 (14%) review articles (table 1).

Table 1 Content analysis of 50 top-cited articles

| Category | Survey | Retrospective study | Systematic review | Review | Case study | Expert Panel | Commentary | Total |
|-------------------------------|-----------|---------------------|-------------------|----------|------------|--------------|------------|-----------|
| Assessment | | | 2 | 1 | 2 | | 2 | 7 |
| Teaching by Humiliation | 3 | | | 1 | 1 | | 2 | 7 |
| Personal Identity Formation | | | | 2 | | | 2 | 4 |
| Empathy | 2 | | 1 | | 1 | | | 4 |
| Ethics | | | 1 | | | 2 | 1 | 4 |
| Barriers to Professionalism | 1 | | | | | | 1 | 4 |
| Definition of Professionalism | 1 | | | 1 | | | 1 | 3 |
| Instilling Professionalism | 1 | | | 2 | | | | 3 |
| Burnout | 2 | | | | | | | 2 |
| Social Media | 2 | | | | | | | 2 |
| Moral Reasoning | 2 | | | | | | | 2 |
| Curricular Modification | 1 | | | | | | 1 | 2 |
| Outcome Measures | | 1 | | | | | 1 | 2 |
| Others* | 3 | | | | 1 | | 2 | 6 |
| Total | 18 | 1 | 4 | 7 | 5 | 2 | 13 | 50 |

Others: 1 each of Role modeling, Beliefs and values, Self Assessment, Remediation, Faculty development program, perception of professionalism.

The table 1 further describes the primary objectives of the 50 top-cited articles. As is clear, the vast majority of publications were related to assessment, teaching by humiliation, followed by personal identity formation, teaching of ethics and empathy, and barriers to professionalism. A smaller number of articles dealt with the definition of professionalism, and instilling professionalism among undergraduate medical students by role-modeling, mentoring and assessment, moral reasoning, burnout, and the effect and use of social media to assess professionalism.

4 Discussion

We reviewed the literature on teaching, learning and assessment of professionalism for undergraduate medical students spanning over almost half-a-century, and studied the temporal trends, publication trends and identified the most cited articles. We observed a surge in the number of publications in the last 20 years. Of the 1000 plus articles on the subject, just over 1/3rd were published in 5 leading journals, and these articles received 50% of the citations. The primary objective of more than 50% of the articles was methods of assessment, teaching by humiliation, personal identity formation, and teaching ethics and empathy.

The reason for sudden rise in number of publications with the turn of the century remains speculative, but may be attributed to the emergence and description of outcome-based and competency-based curricula (ACGME 2001) (17, 18). Professionalism is regarded as one of the core outcome and desired competency of physicians, and hence research

work and publications may indicate the need and importance of teaching and assessing professionalism in medical schools.

We applied Bradford's law to study the publication patterns. Bradford's law states that "If journals were arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus particularly devoted to the subject, and several zones containing the same number of articles as the nucleus" (19). We observed that almost 40% of the articles were published in 5 core journals, receiving 50% of all the citations. We also assessed the productivity of authors. To describe the productivity of authors in the development of a particular field, Lotka (20) described the frequency of appearance of authors. According to the Lotka's law, the relative frequency distribution of author productivity is predicted to be hyperbolic inverse square function. It means that a small number of authors in a field publish the majority of articles (21). Also, authors publishing 'n' number of articles is approximately $1/n^2$ of those publishing one: and the proportion of all authors who publish once only is about 60% (20). It was observed that only 15% of the authors had authored more than one publication, compared to 40% as seen in a mature field. The reasons for a small number of authors to publish more than one paper remain speculative, but may suggest that the field is evolving, and saturation has not reached; alternatively, authors also publish in related fields in medical education, such as, professionalism in postgraduate medical education and amongst practitioners.

Professionalism in medical practice is a complex subject, and the goal of teaching professionalism in medical education remains morphing. Whereas, honesty, altruism, and empathy are usually considered *sine qua non* of professionalism (3), more recently there have been calls to establish identity formation as a goal of medical education to support and guide students. Students entering the medical school arrive with a personal identity formed since birth. As the undergraduates proceed through the continuum of medical education, they go through a dynamic process of transformation, the journey taking them 'from where they started to where they should be', influenced by inherent and external factors. During the process they develop a personal identity, which should match the goal of profession – to serve the society and uphold the values of profession. Of the 50 most cited papers, several articles describe various aspects of personal identity formation (10, 22, 23).

Literature has mentioned the understanding of professionalism in medical students with personal identity and promote assessment practices that reflects real life situations. Studies on the assessments has recommended part of formative evaluation along with summative assessment. Literature is recommended medical students to question conventional thinking and practice various dimensions of professionalism.

It may be interesting to note that a significant number of the top-cited articles describe two seemingly opposite methods of teaching professionalism. Whereas, teaching by humiliation has been described and reviewed by several articles (14, 24-27) (Swick 1999; Goldie 2007; Wald 2009; Scott 2015; Kumar 2019), instilling professionalism through carefully crafted assessment of performance, beliefs and values, mentoring and role-modeling has been suggested increasingly (28-32). This apparent dichotomy may reflect the huge variation about the perception and definition of professionalism (33, 34).

There are several limitations of the study. Only one database, SCOPUS, was searched to identify relevant articles. However, SCOPUS is commonly used to carry out citation-based systematic literature reviews (Sainaghi, Köseoglu (35), Ahmad, Naveed (36), Geetha and Kothainayaki (37), (38, 39) There are several advantages of using SCOPUS compared to other databases, like Web of Science, ProQuest etc, as SCOPUS includes the widest range of articles with complete reference sets in a consistent and reliable form (40). Another limitation might be that since professionalism in medical practice is perceived from different angles, some aspects of professionalism may have not been identified, however, we identified more than 1000 articles related to teaching, learning and assessment in undergraduate medical education, and this number of publications provides an idea about the scope of the subject.

5 Conclusion

In conclusion, we describe the landscape of published articles on teaching, learning and assessment of professionalism in undergraduate medical schools. The surge in publications since 2000, top journals and frequently publishing authors were identified. Of the most cited articles, assessment methods, personal identity formation, and teaching empathy and ethics predominate.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Strength of This Review

Literature search on teaching, learning and assessment of professionalism for undergraduate medical students spanning over almost half-a-century, and studied the temporal trends, publication trends and identified the most cited articles. There is a surge in the number of publications in the last 20 years. The reason for sudden rise in number of publications with the turn of the century remains speculative but may be attributed to the emergence and description of outcome-based and competency-based curricula. Professionalism is regarded as one of the core outcome and desired competency of physicians, and hence research work and publications indicate the need and importance of teaching and assessing professionalism in medical schools.

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