SHORT ARTICLE

Published research studies conducted amongst Indian medical undergraduate students: Bibliometric Analysis

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Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures

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Abstract

Objective: Evaluation of published original research conducted amongst Indian medical undergraduate students. **Methodology**: A systematic review was undertaken using keywords "MBBS students" or "medical students" or "health students" or "university students" and "India" through search engines, PUBMED and Google scholar. Considering feasibility, time frame of published original research article was restricted to one-year only i.e. 2016. Research domain, research design, author and other bibliometric details of research manuscript were captured using check-list and analysis carried out using descriptive statistics. **Results**: A total of 99 suitable original research articles were identified under certain criteria and considered in present analysis. With regard to thematic research domain, highest, 29 (29.2%) articles were related to teaching and learning process followed by 13 (13.1%) to mental health (depression, anxiety, sleep, spirituality) of students; 07 (7.0%) were based on physical fitness/ exercise/yoga; and substance abuse (6.0%) amongst medical students etc. Nearly, 86 (86.8%) of articles were cross-sectional descriptive based studies while 13 (13.1%) had intervention based research design. A total of 34 (34.3%) research articles could be labeled as "KAP" (knowledge, attitude and practice) survey. Department wise detail of corresponding author was largely dominated by faculty from pre and para-clinical departments. Highest was community medicine in (35.3%) articles, pharmacology (23.2%), physiology (17.1%), microbiology (6.0%), and biochemistry (4.0%) etc. The studies covered an average sample size of 188.8 MBBS students (20-360, range); 57.5% of research article covered students from only one professional year. However, in 42 (42.4%) articles there was no further mention of gender based sample information. Out of all the references used in research articles, only 57.3% were of recent (2005-2015) origin while the rest were from older time-frame. Conclusion: A systematic evaluation of published original research articles conducted upon MBBS undergraduate students studying in Indian medical colleges was undertaken, probably first of its kind in India. In conclusion, diverse topics of research have been conducted by the teaching faculties and this study provides the over-view of the same

Keywords

Introduction

The current status of medical research in India is unsatisfactory as evidenced by the low output of high-quality research.(1,2) However, a recent study of PUBMED and IndMed database indicated atleast public health research output increased by 42% in last decade (n=474 in 2000 to n=817 in 2010) from India.(3) The Medical Council of India (MCI) has emphasized the importance of undergraduate medical research and mandatory research publication for faculty promotion. Inter-alia studies have shown that research experience at the undergraduate level correlates with research involvement at the postgraduate level. (4-6) This is true when medical students actively undertake research themselves under mentorship of seniors exposing them to not only to research methodology but also to think logically and critically. However, it may also be argued that there is some learning experience, enrichment and healthy two-way communication when students become subjects of research undertaken by faculty in medical colleges.

Bibliometrics are quantitative technique of measuring output, mapping pattern, emerging trend and obsolesce of publications, authorship, citation impact and use of literature. It encompasses measurement of properties of documents and document related processes. (7,8) Descriptive bibliometrics places emphasis on the characteristics features of the document while relational bibliometrics seeks to illuminate relationships within research, such as cognitive structure of research fields, emergence of new research fronts, national or international co-authorship patterns. Evaluative bibliometrics seeks to assess the impact of scholarly work and compares the relative contributions of two or more individual or groups. (9,10) However, the quality judgment on a research product can only be given by peers and expert panel based on detailed insight into content and nature of research.

Therefore, it may be useful to comprehend present status of research undertaken upon medical undergraduate students by faculty in different medical colleges of India.

Aims & Objectives

To capture the bibliometric properties including type and range of research undertaken upon MBBS students studying in medical colleges of India.

Material & Methods

A systematic review was undertaken using keywords "medical students" or "health students" or "university students" or "MBBS students" and "India" through search engines, PUBMED and Google scholar. Considering feasibility, time frame of published original research article was restricted to one-year only i.e. 2016. Thus, all pages of PUBMED and first fifty pages of Google scholar with selected keywords were reviewed avoiding any duplication of articles between two data source and excluding unrelated items. Inclusion criterion included original research studies carried amongst medical (MBBS) students of India and articles published during the year 2016. Other types of manuscripts such as editorial, perspective etc were not considered in this study.

The authors were able to identify 110 original research articles using above mentioned search strategy. However, on detail scrutiny, (11) articles were excluded since they were either carried out on paramedical subject like nurse, physiotherapy dental or post-graduate students; or were retrospective in nature carried upon subject specific question papers; or study conducted in community through assistance/data collection by medical students; and lastly when only abstract was available without complete research article in public domain.

Data collection was carried out during April 2017 and all the listed original articles were downloaded and reviewed in detail. Following characteristics of original research articles or manuscript was captured using checklist: thematic research domain, research design, methods of data collection, sample size of MBBS students actually covered, number of authors, department details of corresponding author, number of pages, number of tables and graphs depicted in the result section, total number of references, recent (2005-15) references and journal references used and articles that could be classified as KAP (knowledge, attitude and practice) survey.

Data management was undertaken using SPSS ver. 20 (IBM, New York, USA) by calculating descriptive statistics. Related research domains were clubbed yet unique titles have been listed separately

Results

A total of 99 suitable original research articles for a one-year period were identified and considered in present analysis. With regard to thematic research domain, highest, 29 (29.2%) articles were related to teaching and learning process followed by (13)

(13.1%) to mental health of students and 07 (7.0%) were based on physical fitness/ exercise of medical students. The research domain of published original articles upon Indian medical student is shown in Table-1.

Nearly, 86 (86.8%) of article were cross-sectional descriptive based studies while 13 (13.1%) had intervention based research design. In addition to questionnaire as a method of data collection, 20 (20.2%) research article undertook measurement/estimation or carried out some procedure upon students. A total of 34 (34.3%) articles could be labeled as "KAP" (knowledge, attitude and practice) survey. Details are shown in Table-2.

Department wise detail of corresponding author is shown in Table-3 that is largely dominated by faculty from pre and para-clinical departments. Highest was community medicine in 35 (35.3%) articles, pharmacology (23.2%) and physiology (17.1%) etc. In 72 (72.7%) research articles, corresponding author was also the first author.

Some of the research document characteristic is shown in Table-4. Average no. of authors per article was 3.67 (±1.6) while average number of pages was 4.98 (±1.4) per document. The studies covered an average sample size of 188.8 MBBS students (20-360, range) per research article. However, in 42 (42.4%) articles there was no further mention of gender based sample information. Out of all the references used in research articles, only 57.3% were of recent (2005-2015) origin while the rest were from older time-frame.

Discussion

A systematic bibliometric evaluation of published original research conducted upon MBBS undergraduate students studying in Indian medical colleges was undertaken, probably first of its kind in India. To the best of our efforts we could not trace any similar studies. In this analysis the highest research domain upon which original articles were published was related to teaching, and learning process (29.2%) followed by mental health of student related research (13.1%) and physical fitness/exercise (7.1%) etc. Teaching, learning dynamics and evaluation process forms the core-activity of student teacher interaction in any institution and motivated faculties are constantly engaged in building, transforming and implementing innovating methods from a large bouquet of training methods.[11] The development and growth potential of an individual are directly correlated with the depth of knowledge, positive attitude, and diverse skills she/he possesses and demonstrates whether at undergraduate or higher level of functioning.[12] That is why this domain has received highest attention of researcher in medical colleges of India.

This study provides a snap-shot of the concept (research amongst medical students) under consideration while needless to say there are still larger number of other Indian research published beyond the indexing site and journal limits but were outside the scope of present analysis and hence this study may not be exhaustive in nature.

The research environment and culture in country has definitely evolved for better and the wheels of change have started rolling. In recent years, there has been boom in research articles and publishing houses (journals) in India following release of guidelines from Medical Council of India (MCI) towards minimum number of research publication for appointment and promotion as faculty in medical colleges. The present study provides objective analysis of Indian specific research undertaken upon MBBS students in the background of socio-cultural scenario at one-end; temporal-distribution; motivation, ease (feasibility), limiting context and scale of technical capacity of faculty at other end. From the students perspective, range of publication definitely indicates that sampled students in various medical colleges would have been enriched following the research activities undertaken either in terms of improvement in their "KAP", need based health screening, sensitization or being exposed to some component of research.

The medical students are the readily available subjects for pre and para-clinical (i.e. predominantly teaching) departments. In this context, easily approachable and cohesive group like medical student offers an easy option for undertaking research by distribution of self-administered questionnaire. But present analysis also points out that only 20 (20.2%) research articles undertook physical measurement/estimation or carried out some investigative procedure on students. Thus, there is lot of scope for quality improvement with more efforts and intervention specific studies in future by faculty. Moreover, majority of these articles were published in local journal with very low impact factor.

There appears to be non-existence of published literature on the current topic of interest however related literature indicate average author per article was 2.79 in Slovenian J of Public Health, 4.04 in European J of Public Health; 3.08 in Health and Population: Perspective and Issues' journal; 3.8 in Indian J Community Medicine and 3.7 in Indian J Public Health.[13-15] The present analysis also seems to corroborate the above finding with an average 3.67 (±1.6) authors per articles.

A study carried out amongst two prominent national public health journals indicated document properties like mean number of pages per article and number of references used as 5.5 (IJCM) and 5.2 (IJPH); and 20.2

(IJCM) and 17.8 (IJPH) references used in original research articles. Nearly 84.42% original research articles in these two-journals were cross-sectional in study design. 16 In our analysis, length of article was found to be 4.98 (±1.4) with 15.7 (±6.7) references and 86.6% cross-sectional design. However, usage of recent references (within 10 years) were found to be lower (57.3%) in present analysis in comparison to 66% in IJCM and 63% (IJPH). The lower proportion probably indicates that young faculties are not putting in their best efforts to undertake extensive and updated literature review to buildup and add new dimension to the current knowledge base. However, another possible reason could be the research domain tested in the western literature of more than a decade old is now being validated/ explored/tried in Indian setting since the current demand for research publication is very high.

In conclusion, diverse topics of research have been conducted amongst Indian medical undergraduate students by the teaching faculties and this study provides the over-view of the same. This analysis may aid scholar to explore newer avenues of research in future or similar study with longer time-frame.

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Tables

TABLE 1 THEMATIC RESEARCH DOMAIN OF STUDIES CONDUCTED AMONGST MBBS STUDENTS (N=99)

SN	Research Domain	N (%)
	Teaching, learning and evaluation method/medical education	29 (29.2)
	Mental health of student (anxiety, body image, depression, emotional intelligence, headache, mood disorder, personality, stress, sleep, spirituality)	13 (13.1)
	Physical fitness/exercise/activity/heart rate/yoga	07 (7.0)
	Substance abuse/tobacco/medication/antibiotics	06 (6.0)
	Mobile health/smart phones/internet addiction/Whatsapp	05 (5.0)
	Nutrition/dietary habits/obesity	05 (5.0)
	Visual acuity/myopia/refractive errors	05 (5.0)
	HIV AIDS/STDs /Hepatitis B/HPV	04 (4.0)
	Organ/eye/blood donation	03 (3.0)
	Community mental/psychiatry disorder /suicide/ electroconvulsive therapy	03 (3.0)
	Menstruation/Dysmenorrhea	02 (2.0)
	Hand hygiene/hand washing	02 (2.0)
	Auditory & visual reaction	01 (1.0)

	Anemia	01 (1.0)
	Bio medical waste management	01 (1.0)
	Cervical cancer	01 (1.0)
	Emergency contraceptive	01 (1.0)
	Chieloscopy	01 (1.0)
	Research	01 (1.0)
	Miscellaneous (autopsy, career aspiration and specialty preference, cadaveric dissection, complementary and alternative medicine, epilepsy, Pharmacovigilance, tuberculosis, travel vaccine)	08 (8.0)

TABLE 2 RESEARCH METHODOLOGY RELATED CHARACTERISTICS

Variable	N (%)
Study design	
Cross-section descriptive	86 (86.8%)
Intervention study	13 (13.1%)
Data collection	
Using questionnaire	99 (100%)
In addition, researcher undertook measurement/ estimation/procedure amongst students	20 (20.2%)
Professional period (≈ year) of students covered	
Only one-year students covered	57 (57.5%)
Atleast two-year students covered	42 (42.4%)
Research articles that could be classified as "KAP" survey	34 (34.3%)

KAP= knowledge, attitude, practices

TABLE 3 DEPARTMENT WISE DETAILS OF CORRESPONDING AUTHOR (N=99)

Department	N (%)
Community Medicine	35 (35.3)
Pharmacology	23 (23.2)
Physiology	17 (17.1)
Microbiology	06 (6.0)
Biochemistry	04 (4.0)
Anatomy	02 (2.0)
Pathology	02 (2.0)
Ophthalmology	02 (2.0)
Others (forensic medicine, medicine, neurology, pediatrics, psychiatry)	08 (8.0)

TABLE 4 SELECTED DOCUMENT CHARACTERISTICS OF ORIGINAL RESEARCH ARTICLES (N=99)

Characteristics	Mean (SD)
Avg. no. of authors per research article	3.67 (±1.6)
Avg. sample size of MBBS students covered	188.8(±139.2)
Avg. no. of result tables depicted	3.0 (±2.2)
Avg. no. of figures (graphs) utilized	1.3 (±1.9)
Avg. no. of references used	15.7 (±6.7)
Avg. no. of pages per document	4.98 (±1.4)
Percentages of recent references used [within 10 years i.e. 2005-2015] to total references used	57.3%
Percentage of journal references to total references used	78.2%