Performance Of Indian Medical Schools In National Institutional Ranking Framework (Nirf) And Appropriate Strategies For Its Improvement

Arun Vijay Subbarayalu, Ahmed Al Kuwaiti, Mohanraj K.

Abstract : Indian higher education system is the third largest in the world whereas several initiatives have been taken by the government to improve its ranking position. One such initiative is NIRF and all the medical schools are evaluated based on a certain stipulated performance metrics so as to publicize their academic and research performance to the students and their prospective employers. This study aimed to describe the ranking position of top thirty medical schools in NIRF based on the ranking results established in the year 2019 and to suggest suitable strategies for its improvement. From the findings, it is observed that All India Institute of Medical Sciences (AIIMS), New Delhi stands first followed by Post Graduate Institute of Medical Education and Research, Chandigarh and Christian Medical College (CMC), Vellore, both positioned at second & third place respectively. Among those top 30 medical schools appeared in the ranking table, 13 located in south India and 17 located at the north. With regard to governance, 14 medical schools run by the government and 16 medical schools run by the private management. Most of the medical schools perform reasonably well in three performance metrics such as Teaching, Learning & Resources (TLR) and Graduate Outcome (GO) and Outreach and Inclusivity (OI). However, a considerable improvement isrequired in metrics such as Research & Professional Practice and Perception (PR). Further, this study suggests appropriatestrategies that would aid medical schools in India to enhance performance to improve their ranking position.

Key Words: Ranking, Medical Schools, NIRF, Performance, Improvement, Strategies, India.

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1. INTRODUCTION

India has seen rapid development in medical education in the last two decades with an improvement in the ratio of doctor to patient populationincreasing from 1:3800 in 2001 to 1:1953 in 2011 (Planning Commission, 2011). It is realized that there is need to establish more medical colleges to narrow down this ratio. During the year 2013, the number of medical schools in India is reported as 381, with an admission capacity to an undergraduate medical course (MBBS) of 50,068 students per year and post graduate students of 22,349 per year (Solanki, A & Kashyap, S., 2014). There is a significant increase in this number since last five years where the number of medical schools in India now total 529, with an admission capacity to an undergraduate medical course (MBBS) of 75,893 students per year (MCI, 2019). Among this, 235 Medical Colleges are run by the Government of India with a total of 31,727 MBBS seats. In addition, there are 9 AIIMS which have 800 MBBS seats for Indian citizens (Medical Council of India, 2019). This substantial increase in the number of medical colleges along with student's enrolment necessitate a need for improving the quality of medical education in India. Beyond the horizon of quality, educational systems across globe have undergone radical changes and many Universities are vying to market their educational products (Ramsubramanian, 2012). This led to the development of university ranking systems in various countries across the globe (Dill & Soo, 2005). At present, there are several university ranking systems exists which includes Academic Ranking of World Universities (ARWU), by U.S. News and World Report Global Universities Ranking, Quacquarelli Symonds (QS) Rankings, Times Higher Education (THE) World University Rankings, Center for World University Rankings, Webometrics (Ranking of World Universities), etc. Over 60 countries have introduced national rankings, especially in emerging economies (Hazelkorn, 2012). Accordingly, the Ministry of Human Resource Development (MHRD) of India has launched the NIRF during the year November 2015 to rank higher educational institutions based on objective criteria to promote competitive excellence. Unlike other ranking system, NIRF established an objective criteria & metrics to rank academic institutions based on the factual data gathered from third party sources as well as from the institutions themselves (National Institutional Ranking Framework, 2019). Using this information, NIRF identify top institutions of higher education and report it in three categories i.e. "Overall", 'category-specific' and domain-specific ranking ". The participation of higher education institution in this NIRF is voluntary and an annual notification is usually given by MHRD to all the new HEIs to get registered by visiting the website i.e. www.nirfindia.org. A stipulated 'start date' and 'end date' have been communicated during each year cycle and all the institutions are instructed to complete their data in the NIR portal. All those institutions which have already participated in the previous year rankings exercise have been preregistered and there is no need to register each academic year. All the institutions are invited to submit the required data through an Online Data Capturing System (DCS) of NIR portal. In DCS, Data is feed in a format that facilitate easy computing of ranking metrics on each parameter as well as to check consistency of data. Moreover, the data of the previous two years, especially

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those related to the faculty, is pre-populated in the DCS, with provision for changes with suitable remarks/reasons for the changes. Besides, help desks are also established to solve technical issues faced by those medical schools in feeding data. In addition to online DCS, publications and citations data of applicant institutions are retrieved from Scopus (Elsevier Science) and Web of Science (Clarivate Analytics). Data on patent published and granted was taken from Derwent Innovation. It is observed that there are standard requirements to be fulfilled by the medical colleges to get into this NIR ranking and it pose several challenges. On exploration of literature, it is witnessed that medical education in India is facing several problems and challenges such as lack of academic accreditation standards where less than 10% of medical colleges have been accredited by National Assessment & Accreditation Council [NAAC] (Ananthakrishnan, 2010). There is a shortage of medical teachers and it accounts to 30-40% in medical colleges (Balbir Singh Deswal& Vijay K. Singhal, 2016). Further, the existing evaluation system adopted in medical colleges weighs only the memory power of students and there is an urgent need for continuous objective observation & assessment of knowledge and skills of each student by his or her own faculty(Supe A, Burdick WP., 2006). To perform well in this national institutional ranking, medical schools in India need to understand its strength and weaknesses on each one of these key parameters so that they can re-align its strategy with an aim to secure a place in NIR table. Thus, this study is conducted with three-fold objectives to viz. (i) describe the criteria of NIRF for medical schools; (ii) describe the ranking position of top thirty medical schools based on 2019 results of NIRF and (iii) suggest suitable and appropriate strategies for medical schools in India to improve their ranking position with regard to five ranking parameters.

2. METHODOLOGY

Study Design

A descriptive study design was adopted to present the methodology adopted by NIRF to rank medical schools in India and to compare the performance of top thirty medical schools with regard to five key NIRF parameters based on the 2019 ranking results. The entire data used in this research is based on the published NIR results pertaining to the year 2019, which is retrieved from department of higher education, MHRD, Government of India 2019. NIR Criteria & metrics used for ranking Medical Schools As per NIR criteria, all the medical schools are ranked based on five parameters i.e. (i) Teaching, Learning & Resources [TLR]; (ii) Research & Professional Practice [RP]; (iii) Graduation Outcomes (GO); (iv) Outreach and Inclusivity (OI) and (v)Perception (PR). Within each parameter, there are a number of other categories on which medical schools will be graded and the summary of these parameters is depicted in the table 1.

Table 1: Parameters, metrics & weights used to rank Medical Schools as per NIR framework 2019*.

S.No.	Parameters	Marks
1. Teaching,Learning&Resources(TLR); Rankingweight:0.30		100
	A. StudentStrengthincludingDoctoralStudents (SS):20Marks B. Faculty-studentratiowithemphasis onpermanentfaculty(FSR):30marks C. CombinedmetricforFacultywithPhD(orequivalent)andExperience (FQE):20marks D. Financial Resources andtheirUtilization(FRU):30Marks	
2.ResearchandProfessionalPractice (RP); Ranking weight: 0.30		100
	A. CombinedmetricforPublications (PU):30marks B. CombinedmetricforQualityofPublications (QP):40marks C. IPR andPatents:Filed,Published,Grantedand Licensed(IPR):15marks D. FootprintofProjects,ProfessionalPracticeandExecutiveDevelopmentPrograms(FPPP):15marks	
1. GraduationOutcomes (GO); Rankingweight:0.20		100
	A. CombinedmetricforPlacement,HigherStudies,andEntrepreneurship(GPHE): 40marks B. MetricforUniversityExaminations (GUE):15marks C. MedianSalary (GMS):20marks D. MetricforGraduatingStudents Admitted intoTopUniversities(GTOP):15marks E. MetricforNumberofPh.D.Students Graduated (GPHD):10 marks	
2. OutreachandInclusivity(OI); Rankingweight:0.10		100

	A. PercentStudents fromotherstates/countries (RegionDiversityRD):30marks B. Percentageof Women(WomenDiversityWD):25mark C. EconomicallyandSociallyChallengedStudents (ESCS):25 marks D.FacilitiesforPhysicallyChallengedStudents(PCS):20marks	
3. Perception(PR); Rankingweight:0.10;		100
	A. PeerPerception:Employers andResearchInvestors (PREMP):25marks B. PeerPerception:AcademicPeers (PRACD):25marks C. Public Perception(PRPUB):25marks D. Competitiveness (PRCMP):25marks	

*Source: National Institutional Ranking Framework, 2019

The NIR parameters largely cover teaching, learning and resources, research and professional practices, graduation outcomes, outreach and inclusivity, and perception. Under each parameter, a number of sub-parameters are considered for ranking and it consist of: student strength, including doctoral students, faculty-student ratio, financial resources takes the form of total budget and its utilization, research and professional practice, intellectual property rights and patents filed, published, granted and licensed, percentage of women, economically and socially challenged students, and availability of facilities for physically challenged students. All the participating medical schools weighed against each parameter and allocated scores based on its performance. After taking into consideration of overall score, each one of the medical schools are ranked individually and the top 30 medical schools are published by MHRD each year.

3. RESULTS

The performance of Indian medical schools with regard to five categories of performance metrics as released by NIRF 2019 is depicted in table 2.

Table 2: Ranking of Medical Schools in India with regard to five categories of Performance metrics as per NIRF 2019

Name of the Medical School	Performance Metrics					Overall Score	Rank
	Teaching, Learning & Resources (TLR)	Research & Professional Practice (RPC)	Graduation Outcomes (GO)	Outreach and Inclusivity(OI)	Perception(PR)		
All India Institute of Medical Sciences, New Delhi	91.81	96.18	66.91	77.43	100	87.52	1
Post	78.60	84.47	76.99	70.74	64.87	77.88	2
Graduate Institute of Medical Education and Research, Chandigarh							
Christian Medical College, Vellore	81.92	49.27	75.52	65.89	92.74	70.32	3
Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	74.88	57.16	79.65	46.08	40.11	64.16	4
Amrita Institute of Medical Sciences & Research	75.62	43.15	73.16	74.49	51.33	62.84	5
Banaras Hindu University, Varanasi	70.57	50.95	76.45	55.29	43.80	61.66	6
Kasturba Medical College, Manipal	67.41	41.11	73.69	73.81	67.29	61.40	7
Jawaharlal Institute of Post Graduate Medical Education and Research, Puducherry	73.83	38.52	64.88	65.74	81.15	61.38	8
Institute of Liver and Biliary Sciences, New Delhi	89.46	36.88	69.96	57.15	21.81	59.80	9
King George`s Medical University, Lucknow	71.17	42.55	73.14	53.54	44.39	58.53	10
Sri Ramachandra Institute of Higher Education and Research, Chennai	71.36	31.45	81.19	62.29	51.33	58.45	11
St. John's Medical College, Bengaluru	73.09	27.53	74.14	67.29	49.32	56.68	12
Aligarh Muslim University, Aligarh	67.26	38.10	84.24	59.80	13.55	55.79	13
Maulana Azad Medical College, Delhi	69.71	28.99	72.86	53.87	44.39	54.01	14
Jamia Hamdard, New Delhi	66.40	42.67	48.86	72.30	19.76	51.70	15

Kasturba Medical College, Mangalore	65.74	22.21	70.05	70.65	37.79	51.23	16
JSS Medical College, Mysore	68.72	19.01	68.14	71.30	34.97	50.58	17
Christian Medical College, Ludhiana	68.43	28.80	60.67	64.78	26.52	50.43	18
Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi	71.64	27.66	64.68	57.50	17.05	50.19	19
Dr. D. Y. Patil Vidyapeeth, Pune	71.50	17.10	70.90	71.31	19.23	49.81	20
Siksha `O` Anusandhan, Bhubaneswar	69.71	16.55	70.50	64.65	31.16	49.57	21
SRM Institute of Science and Technology, Chennai	65.24	27.59	66.91	56.81	22.30	49.14	22
University College of Medical Sciences, Delhi	65.24	39.99	44.43	55.84	26.52	48.69	23
Dayanand Medical College, Ludhiana	76.81	16.78	67.61	55.02	9.05	48.0	24
Saveetha Institute of Medical and Technical Sciences, Chennai	69.01	16.02	69.72	66.09	13.55	47.41	25
Annamalai University, Annamalainagar	60.87	23.42	61.58	51.06	39.13	46.63	26
M. S. Ramaiah Medical College, Bengaluru	71.03	13.08	57.17	63.13	36.40	46.61	27
Regional Institute of Medical Sciences, Imphal West	68.63	11.24	67.21	62.47	29.53	46.60	28
Sri Venkateswara Institute of Medical Sciences, Tirupati	70.49	9.44	72.42	51.43	27.84	46.38	29
Kalinga Institute of Industrial Technology, Bhubanesw	68.18	15.43	57.72	67.65	29.12	46.30	30

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Mean	71.81	33.78	68.71	62.85	39.53	55.66

Overall performance of medical schools in National Institutional Ranking (NIR) While taking into consideration of all the five key parameters used by NIR, AIIMS, New Delhi secured top position with the overall score of 87.52 (out of 100). Following AIIMS, the second and third position secured by Post Graduate Institute of Medical Education and Research, Chandigarh (Mean Score=77.88) and Christian Medical College, Vellore (Mean score=70.32). Overall, 11 out of 30 medical schools secured less than 50 and a suitable strategy need to be devised to improve the performance of medical schools in this ranking table. Further exploration was carried out to ascertain the performance of medical schools with regard to each one of the five parameters used by NIR and it is explained below. Comparative performancemedical schools with regard to Teaching, Learning & Resources (TLR)TLR focuses on four key parameters such as students' strength, students-faculty ratio, combined metric for Faculty with PhD (or equivalent) and financial resources utilized by the medical schools. Among the top thirty medical schools reported in the year 2019, AIIMS attained top position where it secured the score of 91.81 (out of 100) in TLR. AIIMS is followed by Institute of Liver and Biliary Sciences, New Delhi where it secured the score of 89.46 in TLR. Christian Medical College, Vellore was reported at third position where it secured the score of 81.92 in TLR. The average performance of top thirty medical schools in TLR is reported as 71.81 during year 2019. Comparative performance medical schools with regard to ResearchandProfessionalPractice (RP)The research & professional practice (RP) performance of medical schools are measured based on its achievement in the following key areas viz. combinedmetricforpublications; combinedmetricforqualityofpublications; patents which arefiled, published,granted& licensed and lastly, footprintofprojects,professionalpracticeandexecutive developmentprograms organized by the medical schools. From the ranking results of the year 2019, AIIMS attained top position where it secured the score of 96.18 (out of 100) in RP. AIIMS is followed by Post Graduate Institute of Medical Education and Research (score=84.47) and Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (score=57.16) in RP performance. A number of 26 out of 30 medical schools secured less than 50 in this parameter and it clearly indicate that research component needs to be improved in medical schools in India. The average performance of top thirty medical schools is reported as 33.78 in RP during year 2019.Comparative performance medical schools with regard to Graduation Outcome(GO)The performance of medical schools on graduation outcomes is measured through an appropriate weightage given to the following five key metrices viz. placement, higher studies, and entrepreneurship; students outcomes in university examinations, median salary; graduating students admitted into top universities and the number of Ph.D. students graduated. From ranking results for the year 2019, Aligarh Muslim University, Aligarhattained top position where it secured the score of 84.24 (out of 100) in GO and it is followed by Sri Ramachandra Institute of

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Higher Education and Research, Chennai (score=81.19) &Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (score=79.65). A total of 15 out of 30 medical schools perform reasonably well where all scored above 70 in GO. The average performance of top thirty medical schools in GO is reported as 68.71 during the year 2019.Comparative performance medical schools with regard to Outreach and Inclusivity (OI)The fourth important parameter considered by NIRF while ranking medical schools is outreach & inclusivity and it measures four key metrices i.e. regional diversity (percentage of students from other states/countries); women diversity (percentage of women students); existence of economically and socially challenged students and; facilities available for physically challenged students. Among the top thirty medical schools reported in the year 2019, AIIMS attained top position where it secured the score of 77.43 (out of 100) and it is followed by Amrita Institute of Medical Sciences & Research where it attained the score of 74.49 in OI. A total number of 8 out of 30 medical schools perform rationally well where all scored above 70 in GO. The average performance of top thirty medical schools in IO is reported as 62.85 during the year 2019. Comparative performance medical schools with regard to Perception(PR)This is usually carried out through a survey of employers, professionals from reputed organizations and a large category of academics to ascertain their preference for graduates of different institutions. Under this parameter, equal weightage is given four key elements and it consist of: peer perception (employers and research investors); academic peers; public perception and competitiveness. From ranking results of the year 2019, AIIMS attained top position where it attained the score of 100 and it is followed by Christian Medical College, Vellore which scored at 92.74 in PR. A total number of 23 out of 30 medical schools secured less than 50 in this parameter and it clearly indicate that this practice of collecting various key stakeholders' perception & utilizing them to improve the quality of education is much limited in Indian medical schools. The average performance of top thirty medical schools in PR is reported as 55.66 during the year 2019.

Further, the researchers attempted to explore those medical schools secured position in the NIR results of the year 2019 to understand its governance (i.e. ownership) & geographical location and it is given in the table 3.

Table 3: Location-specific classification of Medical schools participated in National Institutional Ranking Framework of India 2019

#	State where the medical school located in India	Number of Medical Schools appeared in NIR 2019	Type of the Institution (Governance)	
			Government	Private
1	New Delhi	6	5	1
2	Tamilnadu	5	1	4
3	Karnataka	5	-	5
4	Uttar Pradesh	4	4	-
5	Punjab	2	-	2
6	Odisha	2	-	2
7	Kerala	1	-	1
8	Chandigarh	1	1	-
9	Pondicherry	1	1	-
10	Maharashtra	1	-	1
11	Manipur	1	1	-
12	Andhra Pradesh	1	1	-
	Total	30	14	16

The most notable ethnic division in India is between north & south and more than 95% of population falls between these two ethnic groupings (Understanding Regional Diversity of Indian Students, 2019). Conformance with this population statistics, medical schools are established and located in these regions. Among those top 30 medical schools, 17 located in north India and 13 belonging to the southern states. Specifically, 6 medical schools located in the capital city of Delhi managed to get into the top 30 ranking positions. Next to that, five medical schools located in the state of Tamil Nadu & Karnataka and 4 medical schools located in the state of Uttar Pradesh secured their slots in the top 30 ranking table. Among those top 30 medical schools, 14 of them run by government and rest of the 16 run by private management.

4. DISUCSSION

This research article addresses the ranking performance of Indian medical schools in NIR and it is the first of its kind study in the literature to address this issue. The data presented in this article are based on the results published by the national institutional ranking framework (NIRF) for the year 2019. As such, this research clearly depicts a ranking performance of top 30 medical schools in India and an in-depth analysis was made to understand how these medical schools perform in each one of the five parameters stipulated by NIRF. Specifically, this study addressed three key objectives: firstly, it narrates the criteria adopted by NIRF to rank medical schools in India. Secondly, it described the top 30 ranking positions held by medical schools and lastly, it suggested suitable strategies to medical schools on how to improve their ranking position with regard to five ranking parameters. A total of hundred marks is allocated for each one of the five parameters and appropriate weights are given based on the importance of each parameter while finalizing the overall score for the medical schools. The first ranking parameter explored was the performance of medical schools with regard to Teaching, Learning & Resources (TLR). A 30% weights have been allocated to teaching, learning and other resources prevailing in the medical schools such as student's strength, students-faculty ratio, number of faculty with PhD qualification & experience and financial performance of the medical schools. Most of the global ranking providers such as QS, THE, and U-Multirank (the latter at discipline level) use faculty-student ratio as one of the important parameters for ranking higher education institutions (Philip G. Altbach and Ellen Hazelkorn, 2018). Those medicals schools which was maintaining an optimal ratio of 1:15 (i.e. one faculty for every fifteen students) are awarded with maximum score in this category. From 2019 ranking results, it is observed that all those medical schools appeared in the ranking table secured 100% score in this category by fulfilling appropriate faculty-student's ratio. On the other hand, Post Graduate Institute of Medical Education and Research, Chandigarh performed better than the other medical schools with regard to availability of faculty members with PhD qualification & experience (score=18.71) and it is followed by AIIMS (Score=18.35) and Christian Medical College, Vellore (Score=18.20).

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Another important category studied includes the financial sustainability of HEIs and it is a factor of paramount importance since it characterizes the sustainability of the HEI in the long term (ZannaCernostana, 2018). The findings of this study indicated that most of the medical schools run by the government performs well in this category when compared with those run by the private sector (i.e. almost all the private medical schools scored <10 out of 30 in financial performance). The next parameter studied include the performance of medical schools with regard to Research and Professional Practice (RP). Medical training all over the world is becoming more student-centered, with an emphasis on active learning rather than on passive attainment of knowledge (Jones et al., 2001). As a result, there has been a significant movement toward providing medical students with early research experience within the medical school curriculum (Lloyd et al., 2004; Frishman, 2001; Bickel and Morgan, 1980).Doing quality medical research, which improves patient care, improves medical education, reduces budgetary expenditure, and benefits the society at large, is also an important responsibility, though often underrated (Asokan&Shaji, 2016). From the findings of this research, it is observed that one third of medical schools (i.e. 10 out of 30) scored less than 20 in RPC. Among the top 30 medical schools, two of them (i.e. AIIMS and Post Graduate Institute of Medical Education and Research, Chandigarh) scored above 80 and only four medical schools secured above 50 in RPC category. One of the research papers also cited that top 6 medical colleges published more than 56% of total research papers since 1990s (Tullu MS, Karande S, 2016). Most of these papers not only pointed out poor quality of research but also academic dishonesty, plagiarism, publications in non-indexed substandard medical journals without review as some such shortcomings (Kanjaksha Ghosh &Kinjalka Ghosh, 2019). Thus, in order to improve the ranking position of medical schools in india, it is paramount to strengthen the research-related activities by providing appropriate infrastructure and funding for research. Third parameter studied include the performance of medical schools pertaining to Graduation Outcome (GO). This parameter is the definitive test of the effectiveness of the core teaching/learning activity, and measures the student program completion rate and their success in securing appropriate jobs in relevant industry and Government or taking on further higher studies. It is argued that there is link between the ranking position of medical schools and performance of the hospital where its graduates employed. An earlier study also indicated that a statistically significant but negligible correlation between the rank of a medical school and the total performance score of the hospitals that their graduates practiced in (Ravishankar Rao A and Daniel Clarke, 2019).According to NIR, 'graduation outcome' is measured based on the percentage of students passing the respective university examinations in stipulated time for the undergraduate medical program in which they enrolled (60% weightage is given for this category) and average number of Ph.D students graduated (awarded Ph.D) over the previous three years (40% weightage is given for this category). Among the top 30 medical schools reported in this study, two of them i.e. Aligarh Muslim University, Aligarh (84.24) and Sri Ramachandra Institute of Higher Education and Research, Chennai (81.19) performs better

than other schools in this category. From table 2, it is also witnessed that most of the medical schools perform reasonably well in this category where the average score is reported to be 68.71. The next parameter explored in this study is Outreach & Inclusivity and it is measured based on regional diversity, women diversity, presence of economically & socially challenged students and the availability of facilities to accommodate physically challenged students. NIRF puts special weight on representation of women and socially challenged persons in student and/or faculty populations, and also on outreach activities of the medical schools. As based on 2019 results, AIIMS tops the ranking table with score of 77.43 followed by Amrita Institute of Medical Sciences & Research (Score=74.79) in this Outreach & Inclusivity ranking parameter. It is interesting to note that medical schools run by the private management perform well in this parameter when compared with those run by the government. Lastly, the authors explored the performance of medical schools with regard to the perception of each institution by its stakeholders.In recent times, HEIs have paid increasing attention to the views of students and are obtaining feedback on their experience of learning & teaching through the conduct of surveys (Alderman, Towers, and Bonnah 2012). Earlier studies also highlighted that students' appraisal of teaching quality in an academic programme and it is considered as one of the important aspects regarding quality management in higher education (Al Kuwaiti A & Subbarayalu AV, 2015; Rubaish, 2010). Besides student's feedback surveys, employees also sensitive to several aspects of their jobs, including the nature of work, co-workers, managers, and pay (George and Jones, 2008). The faculty members of higher education institutions (HEIs) have a strong impact on the success of students and in the creation of a productive workforce for the economy. Hence, studying the perception of faculty and teaching staff plays a vital role to identify the gaps in performance, which in turn helps to enhance the quality of the medical schools. This will not only improve the quality of medical education but will also improve the medical colleges overall in terms of infrastructure and facilities(Neetu Chandra Sharma, 2019). The findings of this study indicate that AIIMS tops the ranking table with score of 100.0 followed by Christian Medical College, Vellore (Score=92.74) and Jawaharlal Institute of Post Graduate Medical Education and Research, Puducherry (Score=81.15) which gives a significant importance to the perception of the institution by its stakeholders.

Strategies suggested to enhance ranking position of medical schools in India

1. **To improve Teaching, Learning & Resources (TLR)**
   a. Increase the number of PhD qualified faculty members to attain optimum faculty-students ratio. Necessary steps have to be taken to fill all the vacant positions in the medical schools to maintain the faculty-students ratio of 1:15.
   b. Maintain financial sustainability of government HEIs through allocation of sufficient budget. In addition, government should mandate a stipulated budgetary requirement for private organization by increasing the minimum capital deposits needed to

fulfil certain basic infrastructural requirements for medical schools.

c. Improve learning environment with adequate facilities and learning resources.

d. Establish a benchmark for all the available facilities including teaching hospitals, labs and other learning resources to make a progression in teaching and learning environment.

2. To improve Research and Professional Practice (RP)

a. Medical schools should be given an adequate financial assistance to support its faculty & teaching staff for conducting research.

b. Provide opportunities to faculty and teaching staff to present scientific papers in both regional and international conferences that will help to enhance the academic reputation of the medical school in which he or she belongs to.

c. Enlighten the awareness among faculty members about SCOPUS and Web of Science indexed journal list and provide necessary information on research publications.

d. Establish appropriate teaching load for academics and provide sufficient time to faculty to get engaged in both research and other community related activities.

e. Define rewards criteria and provide incentives for those faculty who are publishing in highly indexed journals on a yearly basis.

f. Secure benchmarking agreement with a comparable national and international partner institution for the conduct of joint research projects.

g. Encourage students to conduct joint research projects with their faculty members.

h. Conduct regular & periodic research training programs to faculty and students through national, regional and international partnerships.

3. To improve Graduation Outcome (GO)

a. Develop a learning Outcomes based assessment system of evaluating students' performance at medical schools so that the intended program learning outcomes are assessed properly and it will positively impact the Graduation Outcome.

b. Improve the quality of teaching and provide required learning environment at each medical school so that the graduation rate of students is maintained.

c. Prepare the students with necessary skills that are needed to pursue higher studies both India and abroad.

d. Provide the students with necessary on-the-job training during curriculum (i.e. managerial & leadership skills) which are requiredto fulfil the labour market needs.

e. Support the students with necessary financial stipend to pursue their higher studies especially in doctoral degrees.

4. To improve Outreach & Inclusivity

a. Allocate a certain proportion of students from each one of Indian states to be admitted in each medical school as well as allot some percentage to be reserved for foreign candidates to be admitted in private medical schools.

b. Allocate and enforce a certain quota to be given to women candidates to be admitted in medical schools so as to maintain gender equality.

c. The government should enforce and implement the reservation system for economically & socially challenged students to get admitted in medical schools.

d. Provide an adequate facility to accommodate physically challenged students at medical schools through the provision of ramps, separate parking space and special toilets etc.

5. To Improve the perception of each institution by its stakeholders.

a. Establish institutional effectiveness unit in each medical school which is assigned with responsibility to conduct regular surveys among its stakeholders.

b. Design a suitable questionnaire to collect students, faculty and employers' feedback on a regular basis.

c. Develop a system for analysing stakeholders surveys and provide necessary information to college administration to take necessary action.

d. Strengthen the alumni database and update their information so that the employers of the alumni can be approached to get feedback.

e. Conduct a regular industry-academia meet on a yearly basis and their feedback are utilized to improve the quality of the undergraduate medical program.

5. CONCLUSION

This study is the first of its kind to critically evaluates the parameters adopted by the NIRF in evaluating the performance of medical schools in India. Among the top 30 medical schools chosen by NIRF for the academic year 2019, it is concluded that All India Institute of Medical Sciences (AIIMS), New Delhi tops the list, which is followed by Post Graduate Institute of Medical Education and Research, Chandigarh and Christian Medical College (CMC), Vellore, both placed at second & third position respectively. This study also addressed how these top performing medical schools are distributed across the country and it is found that 13 medical schools located in south India and 17 located at the north. It also describes the governance structure of those top 30 medical schools entered into the NIRF 2019 and it is observed that 14 of them run by the government & rest of the 16 run by the private management. All of those medical schools entered into the NIR table performs reasonably well in three specific ranking parameters such as 'Teaching, Learning & Resources (TLR)' and 'Graduate Outcome (GO)' and 'Outreach and Inclusivity (OI)'. Nevertheless, an immediate attention needs to be given on those two ranking parameters such as' Research & Professional Practice' & 'Perception (PR)' where a significant improvement is needed. This study also suggested appropriate strategies to be adopted by medical schools in India to enhance their ranking position.

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