National Educational Stratification of Medical Schools in Iran

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Abstract

Background and purpose: *After two decades of expansion of medical schools and increasing the number of medical students as one of the most attainable solutions for the problem of substandard status of Iranian community health, recently, quality-based policies in medical education have taken priority over most of the national health plans. To determine differences in the field of education between Iranian medical schools by stratifying their educational services.*

Method: *To measure the educational performance that could be utilized to rate the schools nationwide, a benchmarking tool, consisting of more than 60 indicators, was devised. Each school was asked to introduce a representative who would complete a questionnaire, which was designed to collect schools' information. In the next step, all the divisions were visited by one of the project's members and the school's representative to revise and approve the data. Then, data retrieval was performed and verified at the project's office. Finally, a special computer software was exploited to perform the final analysis.*

Results: *There were 45 public and private medical schools nationwide, which were stratified based on their individual scores. Furthermore, all schools were also ranked in each indicator.*

Conclusion: *This study as one of the phases of Strategy Compilation for Educational Missions of the National System of Medical Education, defines the educational strengths and weaknesses of Iranian medical schools that could be used as a measure for authorities to determine the developmental limits and current stance of the medical schools; and optimize their budget and facilities.*

Keywords: *EDUCATION, MEDICAL, IRAN, RANKINGS, EDUCATIONAL PERFORMANCE, STRATIFICATION, SCHOOL, BENCHMARKING, RANKING.*

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Introduction

Improving the standards of medical schools that impacts on education and public health has been of great concern in many countries especially in the past decades. However holding academic standards is not a sufficient justification for running educational institutions; and in macromanagement, the nation's need for certain graduates must be given priority. Therefore, all biomedical educational service providers must first be evaluated and their educational missions and developmental capabilities be certified, and just thereafter go through the systems of accreditation for their programs.

Some countries when encountered the substandard status of the community health and welfare turned to training a higher number of medical staff as one of the most attainable

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solutions for the problem. But eventually this was not the appropriate solution.(1-4) In the late 80s, Iranian health community encountered the same problem and employed the same strategy. Unfortunately, this expansion rather involved political concerns and short-term goals than a systematic long term planning. So, the growth was disproportionate to the facilities and equipment of the time.

Although these movements realized some of the government's goals, such as a higher number of medical graduates, the allocated budget and equipment were not sufficient and many educational centers had to provide much more services at a less expense.

Now, after about two decades the previous concerns are alleviated and the former quantity-based policy is giving way to a more quality-seeking attitude.

The most rational approach to this transformation is adjusting the number of post-graduate institutions, shrinking the size of the current institutions in proportion to their potentials, and finally reforming some centers to attain the highest possible quality. So Ministry of Health and Medical Education, as the main accrediting body which deploys a variety of systems for evaluation, accreditation, and ranking of medical universities; needed to have a full comparative perspective of all schools. The long perceived need for such an approach was eventually solidified in the form of Strategy Compilation for Educational Missions of the National System of Medical Education and was put on the agenda of the Secretariat for Education and student Affairs of Ministry of Health and Medical Education. The main objectives of this project were determining the developmental limits and current stance of biomedical educational service providers nationwide, assessing their productivity and finally modifying their functions to meet the nation's needs.

The above mentioned project covered all biomedical programs including medicine, dentistry, pharmacy, nursing, midwifery, health, nutrition, allied health sciences and rehabilitation in all medical universities around the country and National Stratification of the Medical Schools was one of its major portions.

Methods

During a period of two years (from February 2002 to March 2004), the stratification of medical schools was performed at the Secretariat for Education and Student Affairs of the Ministry of Health and Medical Education of Iran.

Planning phase

Initially, several sessions were held to define the elements, objectives, methods and implications of the project. The core members of those sessions later formed the Project's Medical Education Expert Panel. The panel also primarily designed data collection questionnaires and criteria and indicators related to each biomedical program.

For the stratification of medical schools, the Committee for Medical Program was formed comprising of the project's executive members, specialists and experts on basic and clinical medicine, and experts on medical education.

Designing the criteria and indicators

A decision tree is an appropriate tool for the statistical ranking. It also helps us to point out the weakness of our data and to generate further questions. Drawing the decision tree requires accurate information on the desirability of each 'branch'. Also a new variable, the 'probability score', is assigned to each branch that states how desirable it will be if the outcome occurs. In the current project, the desirability of each branch of the tree diagram was determined by the schools' information and displayed as the 'school's score' in that particular branch. The probability score of each branch, which indicated its relative importance among the similar branches, was presented by the 'weight' of the branch.

The Medical Education Expert Panel started to work as a prototype and devised a set of criteria and indicators as a decision tree template for evaluation of the educational service provision by medical schools. For this reason, medical education standards of various accreditation systems such as: the Liaison Committee on Medical Education (LCME) (5), World

World Federation for Medical Education (WFME) (6), Asociacion Mexicana de Facultades Y Escuelas de Medicina (AMFEM) (7), the Australian Medial Council (AMC) (8) and General Medical Council (GMC) (9)were thoroughly investigated to devise the criteria and indicators to the current system of medical education in Iran. Some of the college rankings like U.S. News and World Report Rankings(10), MacLean's Rankings (11), Deutscher Akademischer Austausch Dienst (DAAD) (12), SWISSUP Rankings (13), Top American Research Universities (14), The 2000 National Doctoral Program Survey (15) and Baldrige National Quality Program (16) were also considered to cover all possible criteria that could be mentioned in the project. Furthermore, the set of criteria and indicators used in Comprehensive National Rankings of the Medical Schools of Iran[17] were considered in this study.

The list of the criteria was then further refined through brainstorming. Eventually, the listed items were sorted hierarchically. Each and every criterion and indicator was operationally defined and its scoring guideline was designed to ensure reasonable validity and reliability of the scoring across different schools.

Table 1 presents the tree diagram of the set of evaluated criteria and indicators of this project with their individual weights that covers nearly all aspects of education in a typical medical school. The chart is mainly divided into input, process, and output sections.

Stratification in this project vs. accreditation systems

Accreditation systems devise institutional and program standards to approve a program in a specific school regardless of its stance in other peer schools. All assessed medical schools in this project have been accredited and here we compared their quality of education to verify their strengths and weaknesses and provide a documented base for further planning.

Designing data collection questionnaire

A questionnaire was designed to collect the required school information for scoring each criterion and indicator. The questionnaire was primarily designed by the Committee for Medical Program, and was then revised and improved by applying to sample schools and doing several consultations. Different parts of the questionnaire were designed to address as many potentially diverse medical education services as possible, and guarantee acceptable validity and reliability of the acquired information.

Medical school arrangements

Every school was asked to introduce a representative who would complete the questionnaire and serve as the facilitator between the faculty and the project to accelerate the process inside the faculty. All the representatives participated in an orientation workshop, received the questionnaires and completed them in collaboration with different divisions inside their faculty.

Medical school site visits

When the arrangements were made, the project's representatives, who had been briefed on the questionnaire, referred to the medical schools. At this stage, all the divisions were visited by the project's representative and the school's representative to complete and revise the collected information.

Data analysis

The mathematical procedures for calculating the scores of the main branches of the diagram and consequently the trunk of the tree can be summarized as follows:

1) Scoring the end-branch indicators

The leaves (end branches) of the diagram were scored according to the data gathered from the schools, based on the devised guidelines. To maximize the validity and reliability of the school scores in each criterion and indicator, the calculations were verified by two individuals.

2) Standardization

Since the score scales were different, they had to be converted into the same scale before summing up. The highest score was given 100, and other scores proportionately gained a standard score between 0 and 100.

3) Weighting

To determine the weight of each criterion and indicator, the Committee for Medical Program used both Delphi and Nominal Group Technique.

Table 1. The set of criteria and indicators as a decision tree

Division	Division Weight	Category	Category Weight	Criterion	Criterion Weight	Indicator	Indicator Weight
Input	30%	NUEE[1] score	7%	N/A[2]	N/A	N/A	N/A
		Faculty	35%	Raw numbers	35%	Full Professors	29%
						Associate Professors	28%
						Assistant Professors	28%
						Instructors	15%
				Ratios	65%	Student/ faculty ratio	75%
						Senior faculty ratio	25%
		Facilities and equipment	58%	Library	15%	Facilities[3]	40.5%
						Books and Periodicals[4]	59.5%
				Computer resources	11%	Databases	33%
						Internet	30%
						Equipment[5]	37%
				Educational spaces of the faculty	24%	Classrooms, auditoriums	57%
						Basic sciences laboratories	43%
				Hospital clinical training	50%	Training hospital bed[5]	31%
						Clinical wards[6]	22%
						Clinics[6]	36%
						Paramedical services[7]	11%
Process	50%	Administration	71%	Students' affairs	27%	Credits and courses[8]	27%
						Clinical instruction[9]	73%
				Faculty affairs	30%	Faculty development[10]	42%
						Evaluation of faculty's teaching	58%
				Administrative systems	43%	Compliance with regulations[12]	25%
						Examination assessment	18%
						Curriculum assessment	37%
						Syllabus design	20%
		Support and counseling systems	29%	Students	49%	Faculty advisors	33%
						New student orientation	21.5%
						Student guidebook	27%
						Educational noticeboard	18.5%
				Faculty	51%	Sabbaticals	35%
						Participation in international	40%
						Orientation	25%
Output	20%	Students	67%	National examinations	27%	NCEBS[13]	40%
						NCECS[14]	60%
				Graduation rate	40%	N/A	N/A
				Continuing education	33%	Acceptance rate[15]	34%
						Median score[16]	66%
		Faculty publications	33%	Original books	44%	N/A	N/A
				Journal articles	56%	Iranian approved journals	52%
						International journals	48%

Table 1. Continued

National University Entrance Examination score (Konkour).
Not applicable.
Include indexing, reading rooms, seating capacity, seats per student, photocopying and printing.
Include number of books, journal titles, number of reference books, and reference books per student.
In total number and per student.
In total number and facilities.
Include diagnostic imaging, laboratory medicine and pathobiology, physiotherapy, occupational therapy, speech and language therapy, etc.
Include curricular credits, computer, English language and research methodology courses.
Clinical instructions in ward and in clinic.
Includes development in medical education, research methodology and computer skills.
Consists systematic evaluation of theoretical and clinical teaching.
Includes prerequisites, conditional status, dismissal and automated system of registration.
National Comprehensive Examination on Basic Sciences.
National Comprehensive Examination on Clinical Sciences (Preinternship).
Acceptance rate in the national medical postgraduate entrance examination of Iran.
The median of the students' scores in the national medical postgraduate entrance examination of Iran.

Then, the standardized scores were multiplied by their weight.

4) Totaling

The resultant weighted scores for the similar criteria (pertaining to the same node on the diagram) were then summed up to derive their parent branch's score.

5) Re-scaling

Eventually, the total scores of the schools were re-standardized with the hypothetical Best school gaining 100 and others getting fractions of 100. In other words, the highest score in every single indicator is given a value of 100 and likewise the other scores proportionately get a value between 0 and 100. Thus, the hypothetical Best school is an imaginary school possessing highest scores in all the indicators. Naturally the total score of this hypothetical Best school is 100.

After scoring every criterion and indicator pertaining to each school, the final analysis started. Due to the complexity of the calculations for each main branch score, the computer programming team of the project made a special software under the Windows based C^{++} programing language.

Results

There are 38 public and 7 private accredited medical schools in Iran. The oldest modern medical school, Tehran Medical School, was established in 1934 and the latest ones were built in 1995.

All medical schools were ranked regarding not only their overall, input, process and output scores but also every criteria and indicator found practical for schools' planning. The highest medical school, Tehran Medical School, obtained 67.83 from 100.

Results were published as a book named 'Medical Schools of Iran, Rankings and Database'.

Discussion

The purpose of this study was to devise a set of criteria and indicators as a benchmarking tool to investigate the quality of education in medical schools and stratify them based on their potentials.

As it is shown in table 1, we tried to design a complete set of criteria and indicators that covers every aspects of medical education. To design such a complete tree diagram we considered all criteria and indicators used in similar projects except the ones which were not compatible with Iranian educational system, e.g. freshman retention rate and alumni giving[5-16]. Furthermore, Ministry of Health and Medical Education is the only organization to allocate financial resources to universities in Iran and this procedure is mainly based on the size of universities and their total enrollments. Therefore, it was not necessary to consider the university financial resources and

expenditure as a major indicator in our project. It is worth mentioning that since Ministry of Health and Medical Education manages medical schools centrally, schools cooperated for gathering the detailed information. That was a point of strength which made this study feasible and reproducible.

Eventually our tree diagram was a good benchmarking tool to identify the points of strengths and weaknesses of schools compared to peer ones. As discussed previously all medical schools in Iran are being accredited annually to reach the minimum standards for training medical students. This project provided practical guidelines for further improvement in medical education considering the national potential, i.e. the results helped the schools have an overview for internal evaluations and planning.

As mentioned previously even the nation's best medical school could not get a total score of 100 and was far away from the optimal status, so it can follow the example of other schools, even those with a lower total score, to overcome its educational weaknesses in specific indicators.

On the other hand, this project provided a documented base to optimize schools' budget and facilities, allocate national grants and foster constructive competition among them.

Finally, the analysis of the results of this project can assist the authorities in Ministry of Health and Medical Education to determine the schools' missions considering their national potentials and workforce assessments; e.g. when we have excess medical workforce in country this project suggests strategies for modifying the schools total enrolments, altering their missions and preventing the establishment of new medical schools.

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