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Medical Education

MBBS student selection: search for proper criteria

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Abstract
It is accepted that selecting students for the MBBS course is fairly difficult and not totally effective. This article documents the process undertaken at Kathmandu Medical College (KMC) with reference to previous attempts and suggestions for the future.

Keywords: Admission process, medical students, selection, KUMET, Interview, criteria

Medical student selection is a challenging and controversial process. Although, majority of students selected for entry make first-rate practitioners, the system may undoubtedly exclude very many able students who would make excellent doctors. It may lead to admission of a small number who may turn out to be totally unsuited to medical practice. The qualities of the "good doctor" are difficult to define and even more, difficult to measure. Early personal virtues may not be the same as eventual professional goodness and capability. History of medicine has shown that those who made considerable contributions to medicine have been academically able but autocratic, and others creative but difficult to work with. Looking for all virtues in all students may exclude the awkward, the angular and the non-conformists.[1]

In the present context, almost all the medical schools in the world use some criteria to select students to enter their educational programmes. These criteria of selection tend to comply with one or more of the three reasons which are: (i) to select those who can successfully complete the course; (ii) to select those who will effectively implement the objectives to the educational programme; and (iii) to reward those who have shown excellence in the studies which they have taken prior to applying for entrance into medical schools i.e. those who have received high scores in higher secondary courses (such as pre-university certificate, I.Sc, GCE A level). However in many instances the selection procedures tend to satisfy only the third reason listed above without any attempt to recognize other important affective areas[2].

This paper discusses medical student characteristics and presents strategies that medical schools could use in the selection process to enhance the graduation of students who are most likely to become competent doctors. In this way, medical schools will be able to recruit and select students who are most likely to become excellent physicians, and also to produce a more appropriate balance of all specialists to meet the needs of the population.

Requirements for medical student

1. Students preparing to study medicine should acquire a broad education, including that of humanities and social sciences.
2. Students, to be adjudged competent, must, in addition to technical and clinical skills, be able to display appropriate attitudes and competence in such areas as communication and empathy. The question inevitably arises as to the criteria for selecting those who are to become healthcare professionals.
3. Students should seek out activities that will help develop skills in independent thinking and decision-making.
4. Students need to be able to read and understand scientific literature in English. They must also communicate effectively and possess skills to express their thoughts and ideas. It is important to develop and demonstrate a commitment to lifelong learning.
5. Medical colleges must select students who possess the intelligence, integrity and emotional characteristics necessary for them to become effective physicians.

In addition to the academic criteria, students should possess those personal qualities that lead the student to develop into a good doctor. These qualities include:

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1. Empathy (the ability to project oneself into the mind of another, and so fully understand that person's needs) and a caring manner;
2. The ability to communicate (listening, talking and writing);
3. The ability to cope with incident in a profession which may be very stressful.

We also expect candidates to have significant non-academic interests which will help in coping with the stress during medical education and after training as a professional. However we at medical colleges all have more applicants than places and some selection process is necessary. Selection requires two steps:

A. The first step is the identification of students who have the necessary attributes to practice medicine.

B. The second step is the subsequent ranking of the ablest students because our medical school intake is limited.

Some guiding principles for the selection and admission of medical students.[3]

Some guiding principles for the selection and admission of medical students to medical college that have been agreed by many medical councils are as follows:

1. Selection for medical school implies selection for the medical profession.
2. Candidates should have obtained some experience of what a career in medicine involves, and be able to demonstrate their suitability for a caring profession, as the primary duty of the doctor is to the patient.
3. The selection process should attempt to identify the core academic and non-academic qualities, which doctors must possess, as a high level of academic attainment will be expected.
4. Appropriate attitude for the selection process for medical students must be transparent and involve procedures that respect obligations towards the community and offer equality of opportunity.
5. Appropriate attitude for the practice of medicine requires the highest standards of professional and personal conduct plus also the highest standards of professional competence.
6. Failure to declare information that has a material influence on a student's fitness to practice may lead to termination of their medical course. (The question arises as to whether those who may not be fit to practice should be enrolled and be allowed to graduate as doctors)
7. Medical schools should welcome mature students aware of health care environment, requirements, responsibilities and who satisfy the selection criteria
8. The process must be fair to students, avoid discrimination, be reliable and rank the students on valid measures.
9. Medical schools have a social obligation to admit students with the diversity of social and cultural backgrounds needed to serve multicultural, socially diverse, geographically spread societies.
10. The selection of individual students must not be influenced by any political or financial factors. Each medical school should have policies and practices ensuring the gender, racial, cultural, and economic diversity of its students. Each school must develop and publish technical standards for admission of handicapped applicants, in accordance with legal requirements.

Objective of the study

The objective of this study is to address the following:

1. To select those students who can successfully complete the course.
2. To set a standard criteria for admission at KMC.
3. To assess the interview procedure.
4. To recommend specific policies with a view to suggesting an efficient and effective method of selecting students for admission in future years.

The criteria of admission for Nepali students at KMC are[4]:

The guidelines that have been issued may be categorized into three groups, which are as follows:

1. By the Kathmandu University
   a. Nepali citizenship,
   b. Pass 10+2/I.Sc./equivalent academic requirement with English, Physics, Chemistry and Biology (PCEB) scoring 50% together with 50% in aggregate.
   c. Pass the Kathmandu University Medical Entrance Test (KUMET) rank A, B and C.
2. By the Medical Council of the country
   Nepal Medical Council (NMC) has brought out its own guidelines for MBBS education in 1993 and revised it in 1995(4). This stated prerequisites for admission such as:

a. The minimum age of admission to be 17 years.
b. That the candidate should have passed the PBC subjects with a minimum of 50% together with over 50% in aggregate.

3. By the Kathmandu Medical College
   a. As there is bound to be some difference in performance among the scholarship and fee paying students, it is suggested that a study be done of the three categories of students at KMC:
      i. Ministry of Education scholarship students who were admitted even without interview.
      ii. Those admitted from the A, B or C categories of KUMET results.
      iii. Foreign students admitted on the basis of HSC or equivalent and an interview.

Selection Criteria

KMC's goal is to select the most capable students to attend the college and to have a balanced, but heterogeneous group that will excel in both the art and science of medicine. We recognize that a diverse student body promotes an atmosphere of creativity, experimentation and discussion that is conducive to learning. Exposure to a variety of perspectives and experiences prepares students to care for patients in all walks of life and in every segment of society. Considered individually, age, colour, gender, race, national origin, religion, status as a disability are not determinants of diversity and are not identified as unique characteristics during the admissions process.

All Nepali applicants at KMC were required to have passed the KUMET examination. The minimum acceptable score was A and B. All the applicants were told that only those applicants having KUMET result A and B would be called for interview whereas KUMET result C would be only called for interview if there were vacancies. This situation did not arise.

Admissions Committees Overview

A four member Interview Committee had been formed. The Interview Committee assured that no applicant who met the requirements to proceed to the interview process was rejected. KMC's belief was that, students carefully selected, trained, and properly confronted at the selection process, took their roles extremely seriously and added a valuable perspective to the discussions. Only those candidates who satisfied minimum requirements for selection criteria were interviewed. All decisions made by the Interview Committee were final.

Interview Process

The primary purpose of the interview was to identify those who would be able to deal compassionately and effectively with patients. Interviewers tried to elicit the candidate's motivation for seeking a medical degree, understanding of the medical profession, problem solving skills, understanding of medical ethics and interpersonal skills. The interview explored matters the students had raised in their Supplementary Application Form. Each interview was assigned on the basis of first come, first form submission and typically lasted between 10-15 minutes. Interviews were conducted independently and extensively ranging from the candidates hobbies to medical inclination.

The interview team's intention was to put the students at their ease during the interview but the candidates must have understood that the interview was competitive. The interview was structured but allowed for the flexibility to explore a range of topics. The interview also tried to explore matters they had raised in their Supplementary Application Form. The interview was not a test of their academic ability as this had been done by KUMET already. Some candidates were surprised at this. The interviewers were for judging their motivation, general suitability to medicine and communication abilities. The interviewers independently provided numerical scores under above mentioned heads and written comments on the candidate which was given as a form of questionnaire

The four interviewers scored candidates on a scale of one to seven score after interview with strong consideration of their past academic qualification and extra achievement. The score given by each interviewer was added and combined score of each candidate was analysed and determined whether the applicants should be selected for admission.

Selection Process

The Selection Committee discussed each application presented in depth. After this discussion, members of the Selection Committee independently graded each applicant. Those grades were added for a rank score that constituted maximum 28, the candidate's final ranking for selection.

The Interview Committee reviewed candidates' performance daily and added to its rank listing until all approved applicants for admission had been presented. Selected applicants for admission were published on KMC website and notified by telephone call. The interviews were mainly focused on:

1. Leadership Ability

Dedication, determination, ability to make decisions and a willingness to contribute to the welfare of

others as indicators of one's ability to succeed in medicine. It was felt that leadership capacity could be demonstrated in a variety of ways such as positions in employment, community and school organizations including coaching, tutoring and mentoring.

2. **Extracurricular Activities**

The committee was interested to see in how applicants dealt with the demands of their lives outside of the classroom. That was a strong indicator of how well they handled responsibilities and dealt with stressful situations. This, it was felt, also predicts how well they would handle the difficult demands of
medical school.

3. **Community/Volunteer Service**

The medical profession is strongly oriented to service in the community. Applicants should demonstrate a commitment to the community by involving themselves in service and volunteer activities.

4. **Research**

Research is the foundation of medical knowledge. We considered participation in research activities to be an important part of the preparation for medical school. Some applications talked of projects undertaken at Higher Secondary School level.

In addition to above heads, interview was also focused onto:

a. Observe the students' inclination towards medical education,
b. Observe the confidence level, verbal reasoning and verbal expression of students,
c. Select only competent and diligent students,
d. Prepare an effective interview method for next batch.

Methods and results

The admissions process for applicants at the Kathmandu Medical College is detailed in the College Brochure and information booklet which is reviewed and printed annually. Copies were made available to all applicants who sat for KUMET and on request, from KMC. The admission process comprised of four stages.

1. Academic stage examined whether the applicant met the minimum academic requirement of the college.
2. Questionnaire stage - Those passing the academic stage completed a questionnaire about their past study, their inclination toward medical professional, extracurricular activities, and positions of responsibility. These responses were consulted in the final assessment.
3. Interview - In an interview of 10-15 minutes, knowledge of the medical course, insight, motivation, personality, communication skills, and interest in medical topics were assessed. This interview was with the 197 interviewees with listed in KUMET A and B.

Results

The admission process for 100 intakes for academic year 2004/05 began in the first week of August 2004. Of the total, 10 seats were already allocated to government scholarships to be decided by Ministry of Education after a written examination and assessment. None of these candidates had to sit for interview with us nor to pass KUMET although some may have done so in the process. Rest of the seats i.e. 40 for International students and 50 for Nepali nationals were planned to be selected by KMC after interview in the manner being described above. The understanding was that if any of the above allocation was not be filled, then students would be taken from the remaining C. Interviews were taken of the 197 students who had been listed in KUMET A and B. The students having KUMET result C weren't called for interview.

All together 277 admission forms were submitted over a period. Among the submitted forms, 197 forms were from KUMET list A and B, 80 were from KUMET C who had been told that they would be called for interview only if necessary. Out of 197 interviewed students, 50.77% was male and 49.23% were female respectively. About 38.6 % were of students having KUMET A, and 61.4% having KUMET B.

It was to be noted that full marks of the interview component selection for admission were 28. This consisted of 7 marks for each of the four interviewers which was mainly based on students' interview performance and past academic qualification.

After the interview, the score obtained by students were analysed and found as

1. The individual score as well as total score obtained by the female after interview was significant ($P<0.001$) than male.
2. The communication skill, presentation of the topic, tackling of the cross question given by interviewers were much better in female candidates than male.

3. The score obtained by candidates in the interview was significantly correlated to that of their previous academic marks (P<0.001).
4. The score given to the candidates by the interviewers was significantly correlated (P<0.01). The net effect was that significantly more female and candidates having KUMET result A were offered places in this selection. Details are shown in Table 1 and 2.

Table 1. Distribution of sex over different Categories.

Category	Male	Female	Total	P value
Total No. of applicants	100 (50.77%)	97 (49.23%)	197 (100%)	
Mean Score obtained in interview	16.09	19.93		P<0.001
Standard deviation	5.58	4.94		
First list after interview	21(31.8%)	45(68.2%)	66(100%)	P<0.001
Final list of admission	31(41.9%)	43(58.1%)	74(100%)	

Table 2. Distribution of KUMET over different Categories.

Category	KUMET A	KUMET B	Total	P value
Total No. of applicants	76(38.57%)	121(61.42%)	197(100%)	
Mean Score obtained in interview	20.85	16.21		P<0.001
Standard deviation	5.02	5.20		
First list after interview	39(59.1%)	27(40.9%)	66(100%)	P<0.001
Final list of admission	33(44.6%)	41(55.4%)	74(100%)	
Correlation of scores given by interviewers				P<0.01

Efforts have been made this year to make the selection process fair and to remove bias. The interviewer team worked very hard with this objective and to finalize the result. After analysing interviews, the top 66 students were selected as the 1st list for enrolment. Amongst this 31.8 %, and 68.2 % were male and female students respectively which was found to be significant (P<0.001). Of this group 59.1 % were having KUMET A, and 40.9% having KUMET B which was found to be significant (P<0.001).

The students on the 1st list were given a weeklong deadline for enrolment. During that time only 45 students of the 1st list had registered their name for admission. As done last year we took 50% fees at the time of admission from the students and remaining fees will be collected on instalment basis during the course. In the meantime many parents whose wards were outside the merit list approached the college and expressed their willingness to pay the full tuition fee at the time of admission if their wards were given a chance for admission.

To fill the remaining seats, the subsequent lists were then published. Priorities were given to those who secured good score and were competitive in the merit

list. Ability to pay the full tuition fees was not taken into consideration nor was it stipulated though some had expressed capacity or desire to do so. Thus the 66 students quota of the 1st list were filled. However, not many Indian students came for admission this year and a further 8 Nepali students were selected from among those left for the seats remaining. This further selection was also in the order of merit of those who were still interested in joining KMC.

Final Assessment

In the total number of Nepali students who finally made it to KMC, it was noticed that of the 74 students selected in three lots (45, 19,10) the breakdown of the KUMET results was A = 44.6%, B =55.4%, Of the 10 students who were sent to us by the Ministry, only few had appeared for the KUMET examination. However because of the existing situation in Nepal, only 16 International students were admitted this year. Many who had enquired for places earlier later refused.

The overall gender and nationals breakdown of the 100 students is as follows

Table 3: Distribution of overall gender and nationals

National	Male	Female	Total
Nepali	31(41.9%)	43(58.1%)	74(100%)
International	8(50.0%)	8(50.0%)	16(100%)
Scholarship	7(70%)	3(30%)	10(100%)
Total	46(46.0%)	54(54.0%)	100(100%)

Discussion

There is no single selection measure that is valid, reliable and measures all the attributes needed to practice medicine. Academic grades, our most reliable selection measure up to now, are moderate predictors of undergraduate grades but "would be classified as a predictor with a small effect for postgraduate medical competence". High science grades predict pre-clinical results but not subsequent clinical performance, while English marks are variable in their predictive ability. Study of both the humanities and sciences prior to medical school has been shown to predict good performance as an intern. Such broad academic study may be an indication of an all round student with diverse interests important for clinical practice. Grades in compulsory science and humanities subjects may measure different attributes. Oral assessment or interview to identify personal qualities critical to clinical practice might be a more valid method of assessment, but reliability and objectivity are difficult to maintain. Medical practice requires both personal and academic qualities and a combination of assessment measures is essential. Many medical schools use a number of different admission categories to provide opportunities for students coming from different academic and social backgrounds and to ensure diversity in the medical class. There is a special category of admission for mature applicants who have a variety of life experiences including other health professional work.

The selection process should identify those who are likely to be competent and effective healers so that the educational programme can contribute positively to the health of the people. The selection process should be such that it selects those who have the ability to bear other people's negative emotions without losing their kindness, balance, sensitivity and judgement in the face of suffering. Prospective medical students and physicians are expected to possess the intellectual virtues of intelligence, imagination, conscientiousness, meticulousness and perseverance, and the moral virtues of honesty, integrity and altruistic outlook.

Other important attributes in a prospective medical student include the ability to carry out self-directed learning and an enquiring mind that will facilitate the life-long learning process and enable the doctor to cope with postgraduate medical studies and the ever-expanding explosion of knowledge in the medical sciences[2].

The products of medical school should not only be bedside teachers in medical schools but also community-side teachers in far flung areas bringing new knowledge from laboratories to the clinics, from the clinics to the community and retracing the loop ever and ever through a constant education of all concerned: the students and the teachers, the professional and higher centres of learning as well as the society[5].

The study conducted by BPKIHS regarding criteria for students selection, curriculum, examination, patients expectation, qualification of teacher and the nature of graduates in which respondents were medical graduates, medical professionals, political leaders and teachers. The study showed that regarding eligibility to appear in entrance examination, majority (81.43%) of respondents felt that successful completion of 12 years of schooling with science and biology should be the minimum criteria, while 73.43% feel that students with certificate level in medical science should also qualify. Over 76.67% of the respondents favoured students with bachelors degree of higher degree in science with biology to be given chance to take entrance examination. Regarding maximum age at entry to the MBBS course was 25 years[6].

The second study on "public expectations" based on interviews with people from all walks of life revealed their inclination towards "generalists doctors" rather

than specialists. Professional competency, cooperative attitude, and sympathetic approach were identified as important qualities of doctor. A feeling of superiority and money orientation were considered as undesirable qualities of the present doctors. They felt that most doctors are underpaid, honest and intelligent people with many years of training to their credit[7].

KMC has also been using standard procedure to select the MBBS student over past few years. First was the Academic stage which examines whether the applicant meets the medical school's minimum academic requirement. Second was that those passing the academic stage complete a questionnaire about their past study, their inclination toward medical profession, extracurricular activities, and positions of responsibility and third was an interview where the applicants were interviewed 10-15 minutes about inclination to medicine and the course, insight, motivation, personality, communication skills, and interest in medical topics. They were then assessed and these responses were scored.

KMC is planning to introduce tests of problem solving, reasoning ability and communication. We plan to introduce an oral assessment for each student by a trained faculty to assess the attributes of problem solving, motivation, perseverance and tolerance of ambiguity. We are introducing measures already used by a number of medical schools for two reasons. First, they are tested, tried and defendable, and second, we shall be able to contribute information to a large database for further refinement of the selection process. We are planning to introduce a structured interview measuring in seven domains and assessing those qualities, such as communication and the ability to work in teams, which are so critical to good clinical practice. These new methods of selection should enable a wider range of students from a variety of backgrounds to compete successfully for entry to medical school.

The criteria for selecting medical students for KMC have changed gradually only since the college began. There are some questions to be raised and to be reviewed. Are the students who achieve the highest marks in their “intermediate” or recent past academic year going to make the best doctors? Are they going to provide a stable and balanced medical workforce for inside and outside country? Current indications would appear that at least the latter is not so.

Conclusion

It is clear that a wide variety of methods exist globally to select and recruit medical students. Many questions have been highlighted in this paper. It is important to view the criteria used in different parts of the world within the context of the educational system of the country. The most important outcomes of this paper are:

1. There is a need for research to improve the predictive power, reliability and validity of currently used methods of student selection in Nepal.
2. A need exists to develop core value systems for selection practices that may be used within the country.
3. There is a need of group discussions that provide many good examples of best practices and successes, as well as the opportunity to learn of weaknesses and problems in the area of medical student selection.
4. The process provided group members with an awareness of the difficulties of student selection, as well as the opportunity to work collaboratively to explore ways to deal with common problems and issues in student selection, recruitment and the learning environment at medical schools.

Recommendation

1. Selection processes that are fair and measure a range of attributes so that medicine is not seen to be the exclusive domain of those who are particularly good at gaining high examination marks;
2. Standardized test scores and grades should be used only as part of an overall admission assessment that would also include personal characteristics, leadership abilities, past experiences and maturity.
3. Selection. The faculty of each school must develop criteria and procedures for the selection of students that are readily available to potential applicants and to their collegiate advisors. The final responsibility for selecting students to be admitted for medical study must reside with a duly constituted faculty committee.
4. Selecting medical students by academic score alone is no longer desirable. The present practise of giving 28 marks out of 36, albeit as allotted by 4 interviewers, should be reviewed. Perhaps it could be out of 7 or 14.
5. There should be the Undergraduate Medical Assessment Test. This is a test of problem solving, reasoning ability and communication.

The oral assessment, conducted for each student by a trained faculty will be used to assess the attributes of problem solving, motivation, perseverance and tolerance of ambiguity. A structured interview measuring and assessing those qualities, such as communication and the ability to work in teams, which are so critical to good clinical practice.

6. There should be a workshop for providing an excellent opportunity to medical academics to discuss student selection and other matters with colleagues outside of their region or educational system. A productive network can be created amongst group members through online and face-to-face meetings.

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