



THE CEYLON MEDICAL JOURNAL

Established 1887

The Official Publication of the
Sri Lanka Medical Association
Volume 56, No.1, March 2011
Quarterly ISSN 0009-0875

All communications
should be addressed to
The Editors, CMJ

Editors Emeritus

Chris G Uragoda MD, FRCP
Colvin Goonaratna FRCP, PhD

Editors

Janaka de Silva DPhil, FRCP
Anuruddha Abeygunasekera MS, FRCS

Assistant Editors

Dennis Aloysius MBBS, FCGP
D N Atukorala MD, FRCP
Sarath Gamini de Silva MD, FRCP
S A S Goonawardena MS, FRCS
Dulani Gunasekara MD, FRCP
A Pathmeswaran MBBS, MD
Lalini Rajapakse MD, MSc
Channa Ranasinha MRCP, DTM & H
Udaya Ranawaka MD, MRCP
Koliitha Sellahewa MD, FCCP
B J C Perera MD, FRCP
Harshalal R Seneviratne DM, FRCOG
Shalini Sri Ranganathan MD, PhD

International Advisory Board

Kamran Abbasi MBChB, MRCP
London, UK

Raja Bandaranayake FRACS, PhD
Sydney, Australia

Peush Sahni MS, PhD
New Delhi, India

R K Tandon MD, PhD
New Delhi, India

Zulfiqar Ahmed Bhutta FRCPCH, PhD
Karachi, Pakistan

Continued overleaf

Selection criteria towards competent and caring doctors

Introduction

Undergraduate medical education in Sri Lanka began in the 19th Century with the short lived private medical school in Manipay (1848) and the Colombo Medical School (1870). After nearly a century other medical schools were opened and at present there are eight government medical schools. During this 160 years or so many global changes have taken place with regard to the concept of the role of the physician, doctor-patient relationship, primary health care, community-based healthcare, family medicine, mental health, conflict related healthcare, health of the elderly, investigative medicine, information technology and educational theory. These changes provided an impetus for a global change in the philosophy and direction of medical education. Thus the starting material, the student to be put through such a programme of training, has to be pluripotent and has to possess the minimum intellectual capacity, a favourable attitude of mind, and the potential to acquire skills, if they are to be moulded into 'quality' doctors. Several factors bear on the success of producing these quality doctors – one being purposeful student selection.

At present, according to the 2009/2010 University Grants Commission hand book, Sri Lankan medical students are selected on the basis of rank order on average z-scores obtained at the General Certificate of Education - Advance Level (GCE A/L) Examination. Candidates should have obtained at least 'S' Grades in Biology, Physics and Chemistry and at least 30% in the Common General paper. Forty percent of available places are filled in order of z-scores ranked on an all island basis. Fifty five percent of available places are allocated to 25 administrative districts in proportion to the ratio of the total population of the district to the population of the country. Five percent of available places are allocated to 16 educationally disadvantaged districts in proportion to the population ratio as above. It is noteworthy that the university admission policy has changed no less than eight times in the last 40 years [1].

Is this the best possible method of selecting Sri Lankan students for medical studies? Are there selection methods in other countries of proven value which may be applied in Sri Lanka?

The diversity of selection procedures used by institutions the world over testify to the fact that selection to medical schools is yet not a perfect craft. There is a commonality in the qualities that diverse selection procedures attempt to identify and assess, the main ones being – high cognitive ability, motivation and dedication to study, communication skills, attitudes, skill in practical procedures, critical thinking, team working, leadership, non academic interests, and knowledge of current medical matters.

Samiran Nundy FRCS, FRCP
New Delhi, India

N Medappa MD
New Delhi, India

Jane Smith BA, MSc
London, UK

Anita KM Zaidi MMBS, SM
Karachi, Pakistan

David Warrell MD, FRCP
Oxford, UK

**Advisory Board for
Statistics and Epidemiology**

Lalini Rajapakse MD, MSc

Kumudu Wijewardene MBBS, MD

A Pathmeswaran MBBS, MD

Published by

The Sri Lanka Medical
Association
Wijerama House
6, Wijerama Mawatha
Colombo 7
Sri Lanka

Tel: +94 11 2693324

Fax: +94 11 2698802

Internet home page

<http://www.sljol.info/index.php/CMJ/index>

e-mail: office@cmj.slma.lk

Printed by

Ananda Press
82/5, Sir Ratnajothi Saravanamuttu
Mawatha, Colombo 13
Sri Lanka

Tel: +94 11 2435975

Fax: +94 11 2385039

e-mail: anpress@sltnet.lk

For advertising

Please contact:

Mr. Anthony

Saatchi & Saatchi

79, C W W Kannangara Mawatha
Colombo 7

Tel: +94 11 2671026

+94 772514858

© The Ceylon

Medical Journal

**This journal is indexed by BIOSIS,
Elsevier SCOPUS, EMBASE, CABI, and
Index Medicus/Medline**

Underpinnings of a selection process

The prime attribute of a selection process is its predictive validity; i.e. has the selection process been able to predict the future performance of the applicants accurately? Predictive validity has been evaluated by comparing two categories of variables: 'predictors' and 'predicted'. 'Predictors' are the tests that an applicant takes prior to selection. The 'predicted' are the subsequent tests that the selected applicants take in the medical school and beyond. The commonest 'predictors' are the school leaving examinations such as GCE A/L, Grade Point Average (GPA), aptitude tests, interview and its newer variant – the Multiple Mini Interview (MMI), and tests for psychological characteristics such as stress, anxiety and depression.

Unlike the 'predictors', the 'predicted' has received little attention within the selection equation. For example, how effective has the selection process been in relation to performance at pre-clinical examinations, clinical examinations, licensing examinations, and lastly in relation to real life performance of a doctor?

Predictors of success during the medical career

In a systematic review of literature, Ferguson *et al* found that previous academic performance was a good but not a perfect predictor of achievement during medical training [2]. McManus *et al* reported a study, which followed through 79,005 18-year olds who entered university between 1997-8, where a clear relation was shown between A/L grades and university outcome [3]. There are other similar studies [4,5]. Sri Lankan authors were not so conclusive. However, de Silva *et al* concluded that obtaining an aggregate of 280 or above of a possible 400 at the A/L was the only independent predictor of success in all outcome measures [6]. Rajapaksa commented that this study lacked information on some important predictors such as proficiency in English language, and the number of attempts at the A/L examination [7]. In a subsequent study by de Silva *et al* found that less than three A/L examination attempts was a strong predictor of success [8].

Aptitude tests are defined as assessments "designed to measure intellectual capabilities for thinking and reasoning, particularly logical and analytical reasoning abilities" [9]. This said, these tests have been used recently to assess not only intellectual abilities, but also attitudes; e.g. United Kingdom Aptitude Test (UKAT). Aptitude tests have gained in popularity in the past decade due to the apparent ineffectiveness of the end of secondary school national examinations (e.g. A/L) to discriminate between candidates and to assess the attributes such as reasoning skills that are essential to study and practice of medicine.

The literature indicates that aptitude tests such as the Medical College Admission Test (MCAT) in the USA are a reliable predictor of future professional achievement in health and allied health sciences [10,11]. Aptitude tests on their own, however, may not be a suitable criterion for selection [3,5]. The best results may be achieved if aptitude test results are used in combination with other information available for the selectors [12].

Although there is limited evidence in Sri Lanka that A/L results predict the student ability throughout their undergraduate medical course [13], the evidence world over suggests that tests of prior cognitive ability (e.g. A/L, MCAT, GPA) predict only the first few years in the medical school [14]. This finding can be explained by the fact that during the initial years the content learned and tested in medical school is similar to the content tested at A/Ls and aptitude tests. However, as the medical student progresses towards the latter years where the clinical and practical components override the theoretical component, the tests of attributes other than cognitive ability become important [14].

This signifies the importance of not relying on tests of cognitive ability only when selecting medical students. What then are the tests used to assess non-cognitive abilities, e.g. psychomotor skills, communication skills, attitudes, and professionalism? Traditionally, these abilities have been assessed using the selection interview. The selection interview has been implicated with issues surrounding reliability, validity and fairness [15]. Modifications of the traditional interview, where multiple interview panels conduct structured interviews, have produced encouraging results [16]. A method borrowed from the industrial world, called the 'assessment centre', which assesses the applicant more comprehensively over a longer period of time using a battery of tests have produced good predictive validity especially in postgraduate selection [17]. In Sri Lanka no tests are employed to screen the applicants' non-cognitive abilities.

Can medical student selection be improved in Sri Lanka?

On the basis of what has been described above, how may Sri Lankan students be best selected for medicine?

Tests of cognitive abilities

It is clear that previous academic performance should be a major determinant, at least to predict the achievement of theoretical knowledge. Thus, the average z-score should be an important component of the selection process. The current minimum requirement of three passes (S) at the A/L seems inadequate and unrealistic, and should be reviewed. In the last five years, no student had been selected for medicine with only three passes at the A/L. They all had higher grades.

In Sri Lanka district quotas have been in existence from 1979. Such affirmative action is common in many countries [18]. As pointed out, in most instances they are intended to be temporary [19], but have been found to be virtually impossible to reverse. Criteria for classing the districts in Sri Lanka as educationally underprivileged are apparently non-existent, and the list has not been reviewed for the last 10 years, leaving Sri Lanka with a system that is grossly discriminatory against high scoring students in many districts [1]. It is strange but true that more than half the Districts in Sri Lanka (16 of 25) are classed as educationally underprivileged. Mendis [1] has shown that the computation of district quotas on the basis of mid year population is seriously flawed. Furthermore, that 80% of places can be granted on the basis of 'all island merit' without a single district losing all its places.

The article by Hewage *et al* [13] in the current issue shows the English placement test as a good predictor and furthermore agrees with de Silva *et al* [8] that A/L attempt (not more than two attempts) is a good predictor. It may not be such a debatable issue that students should not be selected for medicine if they had more than two attempts

at A/L and that a test of English language should wholly or partially contribute to the z-score. If, however, an English test is to be included in the selection process, it is imperative that standards of English teaching be improved in all parts of the country.

Selection on the basis of aptitude tests is not foreign to the Sri Lankan higher education system. These tests are used for selection to 28 courses or study programmes (UGC handbook). The MCAT for instance assesses verbal reasoning, physical science, biological science and writing sample. Out of these, the verbal reasoning component has been the best predictor [14]. Does the Sri Lankan A/L examination adequately assess reasoning skills? If not, should not reasoning skills be used for selecting medical students in Sri Lanka? We see no impediment in introducing an aptitude test of proven predictive validity to select medical students.

Tests of non-cognitive abilities

In the case of non-cognitive abilities such as psychomotor skills, communication skills, attitudes and professionalism, the MMI and its variants have been useful in assessing the latter three competencies. In the Sri Lankan context, conducting interviews would be fraught with difficulties. For example, interviews would be open to perceived abuse. So, even if educationally sound, we do not recommend interviews for selection. Perhaps to assess non-cognitive abilities one could consider an assessment based on the format of the Objective Structured Clinical Examination (OSCE) which involves multiple stations and examiners [20]. Such an OSCE could be administered to the applicants who have been shortlisted by the A/L and other cognitive ability tests. However, we emphasise that such an assessment should be implemented with utmost caution and meticulous planning to counter the possibility of perceived abuse.

Conclusion

In summary, academic performance at the A/L is an important criterion for selection. We strongly recommend that only students who have had not more than two attempts at the A/L are selected and that the minimum required performance at the A/L should be more than three passes. The present selection process could be improved by introducing tests such as aptitude tests that assess abilities that are not being presently considered for selection, and which are of proven utility in the learning and practice of medicine. Serious consideration could be given as to how a minimum standard in English language could be made a requirement for entry into medicine. The criteria for classing a district as educationally underprivileged should be clearly defined and stated, the district quota system and its underpinning rationale reviewed, and the possibility of increasing the 'all island merit' quota explored.

References

1. Mendis L. Selection of students for medical education. Seventh Deshamanya Nandadasa Kodagoda Memorial Oration, 2004.
2. Ferguson E, James D, Madeley L. Factors associated with success in medical school: systematic review of the literature. *British Medical Journal* 2002; **324**: 952-7.
3. McManus IC, Powis AD, Wakeford R, *et al.* Intellectual aptitude tests and A levels for selecting UK school leaver entrants for medical school. *British Medical Journal* 2005; **331**: 555-9.
4. McManus IC. Medical school applications – a critical situation. *British Medical Journal* 2002; **325**: 786-7.
5. McManus IC, Smithers E, Partridge P, *et al.* A levels and intelligence as predictors of medical careers in UK doctors: 20 year prospective study. *British Medical Journal* 2003; **327**: 139-42.
6. De Silva NR, Pathmeswaran A, De Silva HJ. Selection of students for admission to medical school in Sri Lanka. *Ceylon Medical Journal* 2004; **49**: 81-5.
7. Rajapaksa L. Selection of students for admission to a medical school in Sri Lanka. *Ceylon Medical Journal* 2004; **49**: 147.
8. De Silva NR, Pathmeswaran A, de Silva N, *et al.* Admission to medical schools in Sri Lanka: predictive validity of selection criteria. *Ceylon Medical Journal* 2006; **51**: 17-21.
9. Schwartz S. Fair admissions to higher education: recommendations for good practice. Nottingham, UK: Admissions to Higher Education Steering Group, Department for Education and Skills Publications, 2004.
10. Julian ER. Validity of the Medical College Admission Test for predicting medical school performance. *Academic Medicine* 2005; **80**: 910-7.
11. Violato C, Donnon T. Does the medical college admission test predict clinical reasoning skills? A longitudinal study employing the Medical Council of Canada clinical reasoning examination. *Academic Medicine* 2005; **80**: S14-6.
12. Basco Jr WT, Way DP, Gilbert GE, *et al.* Undergraduate institutional MCAT scores as predictors of USMLE step 1 performance. *Academic Medicine* 2002; **77**: S13-6.
13. Hewage SN, Salgado LSS, Fernando GMO, *et al.* Selection of medical students in Sri Lanka: time to re-think criteria. *Ceylon Medical Journal* 2011; **56**: 22-8.
14. Veloski JJ, Callahan CA, Xu G, *et al.* Prediction of students' performances on licensing examinations using age, race, sex, undergraduate GPAs, and MCAT scores. *Academic Medicine* 2000; **75**: S28-30.
15. Edwards JC, Johnson EK, Molidor JB. The interview in the admission process. *Academic Medicine* 1990; **65**: 167-77.
16. Eva KW, Reiter HI, Rosenfeld J, *et al.* The ability of the multiple mini-interview to predict pre-clerkship performance in medical school. *Academic Medicine* 2004; **79**: S40-2.
17. Patterson F, Ferguson E, Norfolk T, *et al.* A new selection system to recruit general practice registrars: preliminary findings from a validation study. *British Medical Journal* 2005; **330**: 711-4.
18. Crosby FJ, Iyer A, Clayton S, *et al.* Affirmative action. Psychological data and the policy debates. *Academic Medicine* 2003; **58**: 93-115.
19. De Silva KM. International Centre for Ethnic Studies. Affirmative action policies: the South and South East Asian Experience – Editor's Introduction. In: *The Ethnic Studies Report* 1997; **15**: 129-33.
20. Ponnampereuma G. Medical School Selection: A Competency-based Approach. Verlag D. Muller, Germany, 2009.

L Mendis, President, Sri Lanka Medical Council, **G Ponnampereuma**, Medical Education Development and Research Centre, Faculty of Medicine, University of Colombo, Sri Lanka.

Correspondence: LM, e-mail <sirikothe@yahoo.com>. Competing interests: none declared.