

Does Inclusion of Mental Agility Test in Admission Exam Help Better Student Selection in the Health Professions Education Programs?

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ABSTRACT

Academic ability test has been used predominantly in student selection of medical and allied health profession education programs in Nepal. But the use of academic performance as the single selection criterion puts the students from low socioeconomic background at greater disadvantage despite equal suitability due to the lack of adequate guidance and support during their schooling. To address this limitation, use of aptitude test i.e. both the general cognitive and non-cognitive ability tests that measures fluid intelligence and personality traits respectively has been practiced. The measurement of non-cognitive traits has been found to predict the clinical examination score. In Nepal, for the first time, Patan Academy of Health Sciences implemented the assessment of aptitude test (both cognitive and non-cognitive ability test) for the student selection in the undergraduate medical program. Since the inception, Medical Education Commission in Nepal embraced Mental Agility Test, a component of an aptitude test, along with the academic ability test for the nationwide common entrance test in all the undergraduate Health Professions Education Programs. This indeed is an innovative approach in student selection, but in the context of Nepal whether the use of these tools is appropriate in the entrance exam requires psychometric evaluation and further validation through graduates' performance after their enrolment.

Keywords: Health professions education; mental agility test; student selection.

INTRODUCTION

Prior academic performance is the best predictor of academic performance, both during the course and after graduation.¹ However, using academic performance as the sole selection criterion creates a bias against applicants of equal suitability from low socioeconomic backgrounds as disadvantaged students lack access to the courses, role models and support required to achieve their full academic potential during schooling.² Also other studies have shown that measurement of non-cognitive traits, in combination with measures of academic and cognitive ability, can predict clinical examination score while having only minimal impact on academic performance.³⁻⁵ In Nepal, Medical Education Commission (MEC) implemented general cognitive ability test terming it as Mental Agility Test (MAT) in the student selection test for all the undergraduate Health Profession Education (HPE) program from year 2021. This article intends to illustrate the prospect on inclusion of MAT in this nationwide common entrance test.

HISTORY AND RATIONALE

Pre-admission academic grade and academic ability test particularly in physics, chemistry and biology subjects has been predominantly used for the student selection for medical and allied health sciences program in most of the universities of Nepal. Amidst the contemporary trend of using academic ability test alone in student selection, in Nepal, Patan Academy of Health Sciences (PAHS) embraced an aptitude test alone for the student selection in undergraduate medical course for the first time in 2010. This was implemented in collaboration with University of Newcastle, Australia. The students however needed to score $\geq 50\%$ each in physics, chemistry and biology along with $\geq 50\%$ overall score in their high school exit examinations (10+2 or equivalent) to be eligible to sit for the entrance examination as per the regulations of Nepal Medical council (NMC). The reason for shifting a paradigm was to achieve its mission to narrow the health care disparity in rural and urban Nepal since the literature suggested that the use of non-cognitive ability test widens the access promoting equity

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by addressing the disadvantages faced by applicants from rural and lower socio-economic background to enter medical career.⁶

PAHS used only aptitude test such as Personal Qualities Assessment (PQA), Moral Orientation for Justice and Care (MOJAC), Narcissism-Aloofness-Confidence-Empathy (NACE) and Multiple Mini Interviews (MMI) for the test of general cognitive ability test and non-cognitive ability test from year 2010 to 2016. But from year 2017, it revised the admission test guidelines, as per the NMC regulations and added academic ability test and restructured the components of aptitude test retaining only MAT and adding Situational Judgement Test (SJT).⁷ PAHS has also included Social Inclusion Matrix (SIM) in its admission process of undergraduate medical students that gave preferential marks to the students from underprivileged background, from remote areas, and students studying in public school. Whether the use of such complex admission process resulted in better student selection is yet to be studied comprehensively. But, the admissions of students from 70 out of 77 districts over the last ten years at PAHS can be considered to address the issue of inclusiveness in student recruitment with the use of SIM. Additionally, if NMC Licensing Examination can be considered as benchmark for student's performance after graduation, PAHS graduates enrolled with aptitude test alone so far have excelled with more than 95% of the class passing each year in this examination. This considerably speaks for good academic ability of the PAHS graduates who were selected by using cognitive and non-cognitive ability test without academic ability test during admission.

Under the legislation of 'National Medical Education Act 2075' Nepal, MEC was commissioned primarily with the mandate to facilitate unified approach in health profession education, promote the access to underprivileged students and improve the quality of education.⁸ As a part of unified approach in HPE, it has commenced common entrance test for all the undergraduate and postgraduate HPE programs from year 2021. In the nationwide common entrance test of undergraduate HPE programs, for the first time, in addition to the academic ability test on the content knowledge of physics, chemistry and biology that test crystallized intelligence, it has included MAT that test more of the fluid intelligence. MAT included Verbal reasoning, Logical reasoning, Numerical reasoning, Abstract/Spatial reasoning and it constitutes 10% of total weightage of the undergraduate entrance tests of all the HPE programs.⁹

Aptitude tests that include cognitive test (Logical reasoning, Problem-solving ability, Scientific reasoning) and non-cognitive tests (written communication and humanistic qualities) showed good correlation between science section in Graduate Medical Schools Admission Test (GAMSAT) and basic science assessment scores in Australia.¹ UK Clinical Aptitude Test (UKCAT) test showed that although cognitive reasoning test was significantly related to written exams but it is not so for non-cognitive tests, but non-cognitive tests were shown to be related to performance in clinical examinations.^{3, 10} Similarly, de Visser et al showed that association of non-cognitive tests with student performance in undergraduate clinical situations.¹¹

Studies on the aptitude test and its predictive validity among allied health profession is rare compared to medical programs, nevertheless available literature showed that it predicts in-course grade and licensing examination scores in nursing students^{12, 13} and in physiotherapy students.¹⁴ General Mental Ability Test was shown to have a moderate to strong predictor of occupational attainment and performance within occupations.^{15, 16} Therefore, there is a certain consensus across the globe in not limiting student selection solely on the academic ability but also to include aptitude test (cognitive and non-cognitive ability test) in the student selection process to address the need for medical schools to be socially accountable and reduce discrimination in selection procedures.^{17, 18} On the contrary, a recent study on University Medical Admission Test (UMAT) and UKCAT showed that students from higher socioeconomic status and city areas scored high in these exams, which predominantly constitutes aptitude test.¹⁹ It could suggest that coaching/practicing opportunity to the pattern of aptitude test among students from higher socioeconomic statuses could have led to such difference but it is uncertain to what extent does that effect.

Historically, for student selection in medical program, evidence in relation to non-cognitive abilities personality traits has been sought via personal recommendation letters and the use of unstructured face-to-face interviews.²⁰ Since these methods has been considered to have poor predictive validity^{21, 22}, more reliable and valid methods such as PQA²³, MMI²⁴, SJT²⁵ has been used. This non-cognitive ability test is combined with academic ability test and general cognitive ability tests such as Numerical reasoning, Verbal reasoning, Abstract reasoning, Spatial awareness, and Logical reasoning. Presently, various student admission test use aptitude test alone or combined with academic ability test for student selection for medical and health sciences program (Table 1).

Table 1. List of admission exam that use aptitude test for student selection in medical and health sciences programs.

	Country	For programs	Components of Exam
MCAT	USA, Canada, Australia Caribbean Islands	Medical	Biological and Biochemical Foundations of Living Systems Chemical and Physical Foundations of Biological Systems Psychological, Social, and Biological Foundations of Behavior Scientific Inquiry and Reasoning Skills Critical Analysis and Reasoning Skills
GAMSAT	Australia, UK, Ireland	Medical & Health sciences	Reasoning in Biological and Physical Sciences Reasoning in Humanities and Social Sciences Written Communication
UMAT	Australia, New Zealand (1991-2019)	Medical & Health sciences	Logical reasoning and problem solving Understanding people Non-verbal reasoning
UKCAT	UK (2020 onward)	Medical & Dental	Verbal Reasoning Decision making Quantitative reasoning Abstract Reasoning Situational Judgment test
MBBS Admission Test	PAHS, Nepal (2010-2016)	Medical	Personal Quality Assessment (PQA) includes: MAT (Mental Agility Test) MOJAC (Moral Orientation in Justice and Caring) NACE (Narcissism, Aloofness, Confidence and Empathy) PCI (Personal Characteristics Inventory) Multiple Mini Interview
	PAHS, Nepal (2017-2019)	Medical	Physics, Chemistry, Biology Verbal Reasoning Logical Reasoning Quantitative reasoning Abstract Reasoning Spatial Reasoning Situational Judgment Test
MECEE-BL	MEC, Nepal (2020 onwards)	Medical & Allied Health Sciences	Physics, Chemistry, Biology Verbal Reasoning Logical Reasoning Quantitative reasoning Abstract Reasoning Spatial Reasoning

MCAT: Medical College Admission Test, GAMSAT: Graduate Medical Schools Admission Test, UMAT: University Medical Admission Test, UKCAT: UK Clinical Aptitude Test, PAHS: Patan Academy of Health Sciences, MECEE-BL: Medical Education Common Entrance Examination Bachelor Level Programs, MEC: Medical Education Commission

MEC indeed has embraced innovative approach in the national entrance test by including MAT, a component of aptitude test, for all the undergraduate HPE in the context of Nepal and in this region, which previously was only implemented at PAHS, Nepal. Based on the existing evidences, inclusion of aptitude test enables the admission of the underprivileged students from rural areas of Nepal.² However, evidence is yet to be generated regarding the predictive validity of the tools used for MAT in our context across all the health sciences programs. It is not certain at present whether the 10% weightage of MAT in entrance test is sufficient to have significant impact on the student selection from underprivileged background. Further longitudinal studies, on students recruited using these tools on their performance in the college and their professional practice will validate the tools that are being employed. At present, MEC student selection has not included non-cognitive test which has been shown to be associated with the student's clinical performance. There are numerous non-cognitive test tools such as SJT, MMI, MOJAC and NACE. In future, as suitable to the context of Nepal, appropriate tools among these could be opted to further widen the student selection for the unbiased student recruitment irrespective of socioeconomic disadvantage.

CONCLUSIONS

In Nepal, the use of general cognitive ability test was limited to the student selection of medical undergraduates at PAHS. Now the inclusion of general cognitive ability test in MEC nationwide common entrance test for all the undergraduate programs widens the student selection across to both medical and allied health sciences programs for all the institutes of Nepal. This helps to select undergraduate HPE students based on crystallized and fluid intelligence which may, to some extent, contribute towards equitable selection process with the use of MAT test in the country.

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