Original Article

APTITUDE AND PERSONALITY TESTING: WHAT DOES MEDICAL AND DENTAL COLLEGES ENTRANCE TEST 2012 ADD TO THE DEBATE?

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ABSTRACT

Objective:

To determine the relationship amongst the premedical academic achievement, aptitude test and the Entrance Test in the Punjab Medical & Dental Colleges admission test 2012.

Methodology:

An aptitude test of 22 items was administered to the entire population of Entrance Test 2012. HSSC, Matriculation, aptitude test, and Entrance Test scores and their demographic variables were entered into Statistical Package for Social Sciences (SPSS) software v.16 and parametric tests were applied. P-value less than 0.05 was as taken as statistically significant.

Results:

Out of the 36,100 students, 24,988 (69.2%) were females. Students who scored more than 75% marks (19.9%) also scored higher marks in the Aptitude Test *(t=28.45. p-value=0.00)*. Female candidates in general scored higher marks in the Entrance Test ($p<0.05$) and in the Aptitude Test ($p>0.05$). Overall, students from the economically and academically underdeveloped districts of Punjab scored less marks in the Entrance Test ($p<0.05$) and the Aptitude Test ($p<0.05$). The difference in Entrance Test and Aptitude Test marks of students from underdeveloped districts was greater than that of students for the developed districts ($p<0.05$). However, in Matriculation and Intermediate examinations, students from the underdeveloped districts scored higher marks than the developed districts ($p<0.05$). Students scoring higher marks in Matric and Intermediate, scored low marks in the Aptitude Test ($p <0.05$).

Conclusion:

In Pakistan aptitude, personality and cognitive testing will need to be combined in just the right way to select candidates for admission in health professional education program that can contribute effectively in delivering preventive and primary healthcare services to the large majority of the population deprived of the same for past 65 years.

Keywords: Aptitude Test, Entrance Test, Medical and Dental graduate programmes, Pre-medical academic achievements, Under developed districts.

INTRODUCTION

Undergraduate medical/dental education from here onwards refers to as health sciences education like other branches of professional education is a demanding endeavor for the students. It is perhaps more stressful than other educational pathways in requiring considerable integration at the highest levels of cognition, affect and psychomotor skills. During education and then internship leading to professional practice, this integration is

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required for optimal safe performance[1]. HPE, therefore, requires of the teachers and from the students teaching and learning of a huge volume of knowledge, a large number of skills and considerable change in attitude, all integrated to achieve the competency outcomes of the educational program. Another area where special emphasis is placed on HPE is in developing a self learning, life-long learning strategy[2].

Globally the drop-out rate from Health professional education is perhaps the highest in any higher education program. One of the reasons for this higher drop-out rate is the tremendous demand this educational program puts on the students leading to anxiety, depression and burn out[3,4]. Therefore, it may very well be stated that choosing the right 'kind' of students for the program who are able to sustain, even feed off, from this tremendous stress may decrease the drop-out rate, improve the efficiency of the program and the quality of its product.

One aspect of success in HPE can be presumed to be related to previous recorded educational excellence. Proponents of this view only, believe that high scorers in pre-medical competitive examinations will perform better in health education programs[5]. However, pre-medical academic achievement especially in Pakistan is most commonly related to rote learning (memorizing) of a huge volume of facts and figures and developing basic reflex-like laboratory skills and hardly any communication skills or self learning traits. This has lead various academicians nationally and in other parts of the world to acknowledge the contribution of the non-cognitive qualities in an individual in predicting the performance of health professional education students and practitioners[6]. It is this view that has lead some countries including the United Kingdom, United States of America and Canada, amongst others, to introduce aptitude testing as part of the selection protocol for induction in the HPE programs[7,8].

Aptitude is however different from personality. The large volume of data available in literature from developed countries clearly indicates that HPE inductees comprise of a mix of all personality types, since the medical profession is a multidimensional profession with various specialties and avenues which could cater for all personality types[9]. Whereas, personality is the particular combination of emotional, attitudinal, behavioral patterns of an individual, aptitude is a component of a competency to do a certain kind of work at a certain level and can also be considered as 'talent'. Aptitude is related to Intelligent Quotient (IQ) but not to knowledge, understanding, acquired skills, or attitude[10]. From the argument above, it can be inferred that whereas, it may be simpler to determine the personality of individuals using say, a pen and paper test, it is more difficult to determine their aptitude using the same. Therefore, considerably less data is available on aptitude testing at the time of selection of candidates for the HPE programs. The United Kingdom Clinical Aptitude Test (UKCAT) was started in 2006 and currently consists of four sections: verbal reasoning, quantitative reasoning, abstract reasoning and decision analysis and also tests situational judgment[11]. It is believed that UKCAT will help the HPE institutions make better judgment in selecting the candidates. In the United States of America, Scholastic Aptitude Test (SAT) has been developed as a standard test for college admission in the United States. It was first introduced in 1926[12]. Whereas, high scorers in SAT can be presumed to be good college students, it does not have any discipline specificity. On the other hand, literature reports that UKCAT scores are predictive of early year medical college performance, more so than pre-medical academic achievement, interviews, personal statements, letter of references or a combination of these[2,13,14].

University of Health Sciences, Lahore, Pakistan is the largest medical sciences/HPE university in the region with more than 35

colleges affiliated in the entire province of Punjab with population of more than 80 million. Under Pakistan Medical & Dental Council (PM&DC) regulations and directions from the provincial Punjab Government, University of Health Sciences conducts Medical and Dental Colleges Admission Test (MDCAT) annually for selecting more than 6000 students for admissions in the public and private Medical and Dental colleges of Punjab. The University was granted permission by Government of Punjab to include a 22 item aptitude test. This study provides the information on the data collected from MDCAT 2012 held on 23rd of September 2012.

METHODOLOGY

An aptitude test of 22 items was administered to the entire population of Entrance Test 2012, conducted by University of Health Sciences, Lahore at several centers all over Punjab Province. This aptitude test was constructed by a team of psychologists, behavioral scientists, psychiatrists, health professional educationists and senior and junior basic sciences and clinical faculty members at the University of Health Sciences, Lahore.

The response forms were read through Optical Mark Reader (OMR) machines and the scores of students together with their matriculation and HSSC and Entrance Test scores and their demographic variables were entered into Statistical Package for Social Sciences (SPSS) software v.16 and analyzed by using parametric test. P-value less than 0.05 was as taken as statistically significant.

RESULTS

Overall 36,100 students sat in the Entrance Test 2011, of which 24,988 (69.2%) were females and 11,112 (30.8%) were males. Only 19.9% candidates scored more than 75% marks.

Comparison at the point of 75% marks in Entrance Test 2012:

Student t-test showed that candidates who scored more than 75% marks in Entrance test 2012 also scored higher marks in the Adjusted Aptitude Test (t=28.45. p-value=0.00) when compared with the rest of the cohort.

Gender Comparison:

Females scored significantly higher marks in MCAT 2012 than males ($p<0.05$). In case of Adjusted Aptitude Test marks although females scored higher marks than males, the difference was not statistically significant ($p>0.05$). Results are presented in Table no. 1.

Table.1. Gender relationship of Entrance Test and Adjusted Aptitude Marks

	Females	Males	T-Statistics	p-value
Entrance Test marks	626.09	618.03	2.77	0.006
Adjusted Aptitude Test marks	432.86	429.09	1.68	0.093

Comparison at different localities:

Analysis of Variance (ANOVA) showed a significant difference amongst the mean Entrance test marks *(F= 8.29, p-value=0.00)* and Aptitude Test marks *(F=32.12, p-value=0.00)* of candidates of different localities sitting in MCAT 2012. Overall, students from the economically and academically underdeveloped districts of the Punjab scored less marks in Entrance and Aptitude test. The difference between Entrance and Aptitude Test marks of the students from the underdeveloped districts is greater than that of students from the developed districts ($p<0.05$). Mean Entrance and Aptitude Test marks in different localities are shown in fig. 1.

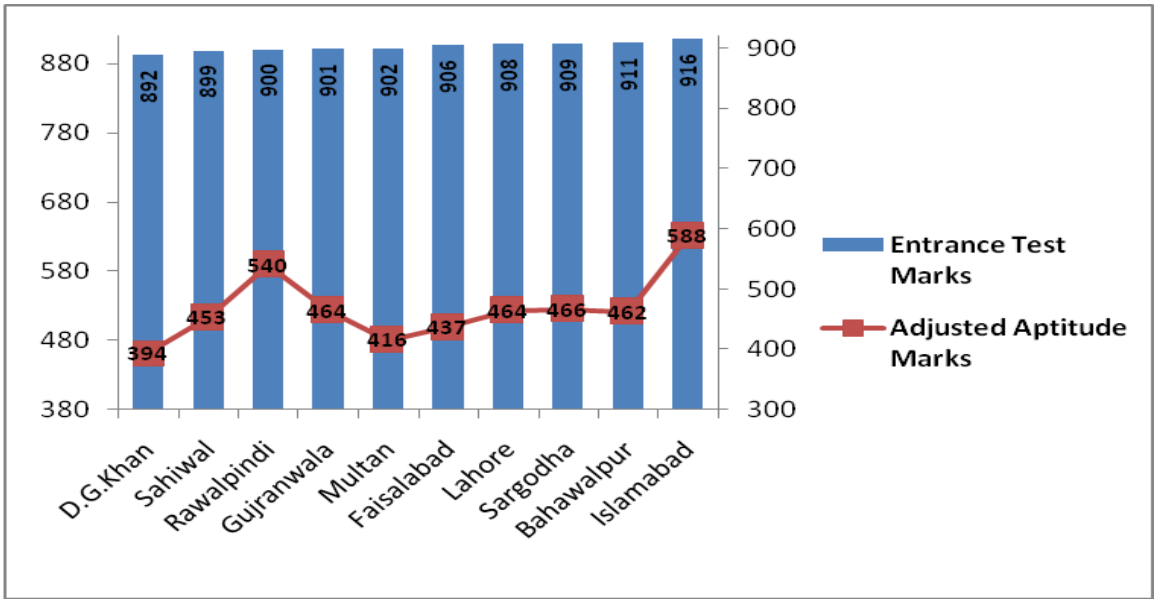

Fig. 1. Mean Entrance test and Adjusted Aptitude test marks in different districts

Significant difference was also found in Adjusted Matriculation *(F= 7.12, p-value=0.00)* and HSSC *(F= 20.99, p-value=0.00)* marks of the candidates from different localities. However, in Matriculation and HSSC examinations students from the underdeveloped districts scored higher marks than the developed districts. Matric and HSSC marks were compared with Entrance test marks and Aptitude scores, students overall scoring higher marks in Matric and HSSC, scored low marks in Entrance test and Aptitude test. Mean Entrance Test marks and Adjusted Aptitude scores with mean Adjusted Matriculation and HSSC marks for different localities are shown in fig. 2.

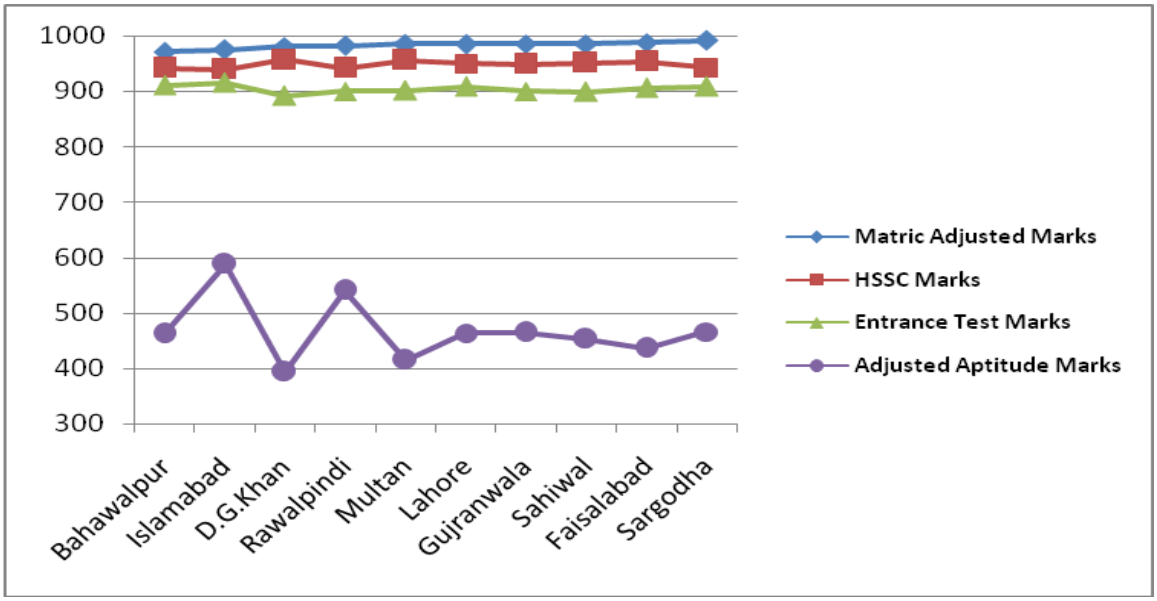

Fig.2. Mean Adjusted Aptitude and Entrance test marks with Adjusted Matriculation and HSSC scores in different districts.

DISCUSSION

Globally different modalities singularly or in combination are used for selection of medical students. These range from random selection through balloting as in the Dutch Medical schools to aptitude testing as in the UKCAT , Biomedical Admissions test (BMAT) and those that include personality testing as in the Graduate Medical Schools Admission Test (GMSAT)[15,16,17]. The increasing trend to determine the aptitude of applicants and to gauge their personality at the time of their admission is gaining global popularity based on the realization that both cognitive and non-cognitive virtues in an individual are required to get through the undergraduate training and become a competent doctor as well as being a competent and safe professional.

A number of studies have positively correlated premedical achievement with performance in medical colleges[18,19]. Similar studies, however, have not been done in this country. Introduction of aptitude and personality testing is a recent global trend[20,21]. A number of studies have identified that there exist poor correlation, if any between high achievement in aptitude and personality testing and academic performance in year one and two of medical colleges. It is believed that more positive correlation will be identified between aptitude testing in personality testing and the clinical years of training as well as later professional practice when the time comes[22,23]. Perhaps one of the reasons for a poor correlation in the early years of medical training could be related to the fact that these early years require assimilation of base knowledge, where even introvert and neurotic individuals with an aptitude for knowledge assimilation can perform well. Whereas extroverts, open and agreeable types may understandably fare less well. Another difficulty with personality testing is related to the fact that a number of studies have indicated that medicine is a multidimensional profession where various personality types can find a niche amongst its diverse specialties[20,21]. This makes selection on the basis of personality typing more difficult. The situation becomes more complex when one factors in the large amount of research that has indicated that social and educational environments play important role in the development of personality including the shaping of interpersonal skills and caring attitudes. Thus personality molding during medical education is a possibility that can be efficiently practiced specially where widening participation from the socio-economically and educationally underdeveloped or deprived classes or localities is derived.

The Province of Punjab in Pakistan has a population of more than 80 million with a huge gender socio-economical and educational diversity. The districts in the centre and the North of Punjab enjoy rapid urbanization, socio-economic and educational development whereas districts in the West and South within Punjab are socio-economically and educationally underdeveloped. The results of our study are exactly similar to the one reported for the Medical and Dental Colleges Entrance Test in Punjab in the year 2011. Better performance in the Entrance test as well as in the aptitude test and the positive correlation exhibited between the two by the students form socio-economically and educationally developed districts is understandable. What is more difficult to understand is the poor correlation between the Higher Secondary School Certificate (HSSC) and matriculation awards and the entrance test and aptitude test marks in the developed districts compared to the underdeveloped districts. This is similar to the findings by Khan et al[24]. previously and seems to be a consistent trend whereby students in the under developed districts perform better in the HSSC and Matriculation examinations but poorly in the entrance test and aptitude test when compared to their counterparts in the developed districts. This poor correlation between entrance test awards and pre entrance test academic achievements is a worrying trend and raises questions that need to be addressed quickly in order to select the best candidates for medical and dental colleges is admissions since educational in public medical dental colleges subsidized and there is paucity of healthcare professionals in the country[3,25]. Further studies will be required to identify the most cost-effective procedure for selecting medical and dental

entrants into colleges and also the means through which preparation for the selection by candidates does not incur any extra economic burden on their families by enrolling in preparation academies. High academic achievement by females is a global trend but it too needs to be debated with reference to local context. In Pakistan more than 70 percent population live in rural areas and 70 percent of the medical and dental graduates are females who do not prefer to work in rural areas, if work at all. This phenomenon puts a huge strain on the government funds as well as on the healthcare delivery system by virtue of producing doctors or dentists that cannot be assimilated in the vast majority of the country.

In a country whose health issues are more directly related to primary and preventive health with the large majority of individuals living below the poverty line; where clean and safe drinking water is available to a minority of ultra urbanized populations and basic health facilities are not available for hundred of miles in rural areas, it can very well be argued that selection for admission into public medical and dental colleges on the basis of individual aptitude to render services in rural areas specially providing primary and preventive health facilities and selecting personality types or developing personalities best suited to do the same will help improve the quality of healthcare delivery in the region[24]. Easier said than done, this requires first identifying personality types suited for this mission devising tests of academic aptitude and personality assessment around clearly defined characteristics for a health professional that shall serve the rural community with its unique health needs. Appropriate selection will be the beginning. The government shall need to prioritize primary health sciences and develop a career structure with suitable incentives for those health professionals that can return to their communities and contribute in the health care delivery services there.

CONCLUSION

Pakistan is a developing country with limited resources but huge potentials if it could only manage its human and physical resources properly. Aptitude, personality and cognitive testing will need to be combined in just the right way to select candidates for admission in health professional education program that can contribute effectively in delivering preventive and primary healthcare services to the large majority of the population deprived of the same for past sixty five years even though in Punjab alone more than 3500 medical and dental graduates are produced each year from public medical and dental colleges where their education and accommodation has been subsidized through utilization of the exchequers money by the government.

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