ORIGINAL ARTICLE

PREDICTIVE ABILITY AND STAKEHOLDERS' PERCEPTIONS OF THE SELECTION TOOLS FOR MBBS IN WOMEN MEDICAL COLLEGE: A MIXED METHODS STUDY

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Background: The selection criteria for entry into the MBBS programme used by Women Medical College (WMC) includes previous academic achievements, namely Secondary School Certificate (SSC) and Higher Secondary Certificate (HSC), and the Medical and Dental College Admission Test (MDCAT). This study determined the predictive validity of these selection tools and explored the perceptions of stakeholders regarding the selection process and the use of selection tools in WMC. **Methods:** This study utilized both quantitative and qualitative methods. Quantitative methods involved a retrospective cohort study design to determine the statistical correlation between the performance of candidates in the selection tools and their subsequent academic achievements at medical college. This consisted of data collected from three cohorts (n=186) of students who graduated in 2014, 2015 and 2016. Qualitative methods of the study explored the perceptions of stakeholders through purposive sampling using face-to-face semi-structured interviews, which were analysed using thematic analysis. **Results:** The study showed very weak correlations of SSC with performance in the fourth professional examination undertaken by the students and HSC with performance in the first and second professional examinations. MDCAT did not correlate with any professional examination. Qualitative analysis identified three emerging themes; a) lack of standardization, b) fairness of selection criteria, and c) assessment of non-cognitive attributes. **Conclusion:** The selection tools showed poor predictive ability for the performance of students in the medical college. Standardizing the selection tools and including an assessment of non-cognitive attributes in the selection criteria is suggested.

Keywords: Medical College; Admission Criteria; Selection Tools; Predictive Validity; Perceptions

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INTRODUCTION

To ensure the best candidates, medical colleges incorporate various selection tools in the admissions process, including previous academic achievements, entrance tests, and interviews. The use of these selection tools is based on their predictive validity, to screen the desirable qualities of candidates, and to make the process fair.[1] Predictive validity refers to the measure of a variable to predict some future performance.[2]

Previous academic achievement is considered one of the best predictors of student performance in medical college, especially in pre-clinical years.[3–5] In Pakistan, the Secondary School Certificate (SSC) and the Higher Secondary Certificate (HSC), conducted by various boards of education, are used as selection tools, and they have previously shown association with student performance in medical college.[6] However, they have shown weak association with performance of students in Medical College Admissions Test (MCAT) in the USA, and it was suggested to standardize the educational boards across the country.[7] Candidates are required to secure 60% or more in HSC to be eligible for admission in medical colleges of Pakistan.[8]

In Pakistan, candidates are also required to take admissions test conducted by the governmental educational entities in their respective province; Educational Testing and Evaluation Agency (ETEA) in Khyber Pakhtunkhwa (KPK), University of Health Sciences (UHS) in Punjab, National Testing Service (NTS) in Sindh and Higher Education Commission (HEC) in Baluchistan.[8] Previous research showed that the entrance test conducted in Punjab is valid and reliable, whereas ETEA showed slight to moderately strong association with university examination.[9,10] Medical colleges in other parts of the world have also utilized entrance tests such as the MCAT in USA and Canada, the Graduate Australian Medical School Admissions Test (GAMSAT) in Australia and the UK Clinical Aptitude Test (UKCAT) in the UK,

which have shown varying results during validation studies.[5,11–13]

In addition to medical college entrance tests, interviews are used by a number of medical colleges to augment the selection process. However, traditional interviews have shown low reliability and validity in previous studies.[14-16] Nonetheless, Multiple Mini Interviews (MMI) have shown good reliability and predictive validity for admissions in medical college.[17–19] The World Federation for Medical Education (1994) has also recommended individual medical colleges to incorporate assessment of non-cognitive attributes for selection of medical students.[19, 20] Some of the non-cognitive attributes which have an impact on the performance of students in medical college are interpersonal skills, personality traits, attitude, motivation and temperament.[12,21]

The selection criteria utilized in WMC consisted of a weighted combination of SSC (10%), HSC (40%) and MDCAT (50%), as recommended by the Pakistan Medical and Dental Council (PMDC).[8] We wished to determine the predictive ability of these selection tools, and explore the perceptions of stakeholders regarding the selection process and the use of the tools. Therefore, this study aimed to address the following questions:

1. How well does the performance of students in the selection tools (SSC, HSC and MDCAT) predict their subsequent academic achievements of MBBS in WMC?
2. What are the perceptions of stakeholders regarding the selection process used for MBBS in WMC?

MATERIAL AND METHODS

This study utilized mixed-methods design. Quantitative methods were employed to address the first research question and qualitative methods were used for the second question.

Data was collected from previous records using retrospective cohort study design.[22] Data of 186 students who graduated in 2014, 2015 and 2016 was collected, excluding students who failed to graduate or withdrew from the course. To maintain anonymity, data was collected using students' roll numbers, which could only be identified by the administration of WMC.[23]

A total of six variables were collected for each student and grouped into two categories; predictor variables and outcome variables (Table-1).

Table-1: Variables

Predictor Variables	Outcome Variables
Secondary School Certificate (SSC)	1st Year Professional Examination
Higher Secondary Certificate (HSC)	2nd Year Professional Examination
Medical & Dental College Admissions Test (MDCAT)	3rd Year Professional Examination
	4th Year Professional Examination

Correlation tests were performed to determine the relationship between the performance of candidates in the selection tools and their subsequent academic achievements in WMC. The relationship between predictor and outcome variables was determined using Pearson's correlation coefficients in SPSS 23. Correlations of 0–0.19 were considered very weak, 0.2–0.34 as slight, 0.35–0.64 as moderately strong, 0.65–0.84 as strong, and 0.84–1 as very strong.[24]

Six semi-structured face-to-face interviews were used to explore the perceptions of stakeholders regarding the selection process utilized for MBBS in WMC. Purposive sampling was utilized, where participants were handpicked according to the needs of the researcher.[25] This ensured representation of a diverse stakeholder group, including three Heads of Department (HOD) from basic and clinical science subjects, one Vice Principal, a student, and an Administrator.

An interview guide was developed which included eight questions about the participants' involvement in the admissions process, awareness of the criteria, their opinion on the current criteria and selection tools, the relationship between the performance of students in selection tools and medical college, and suggestions for improvement. The participants were given pseudonyms to ensure confidentiality and academic disciplines were mentioned to identify contrasting perceptions.[26] All the interviews were audio-recorded, transcribed and analysed using Braun and Clarke's six-step framework for thematic analysis to identify the emerging themes and patterns.[27]

Ethical approval was obtained from the Institutional Review Board of WMC. Participants of the study were given information sheets (this included details about the researchers, the purpose of the study, and the rights of participants), informed consent forms were used to gain permission, and anonymity and confidentiality was ensured. Data of 186 students was analysed through SPSS 23 using Pearson's correlation coefficient between the predictor and outcome variables, to assess the selection tools' ability to predict performance in professional examinations. The results of correlational statistics are discussed below:

a) SSC:

SSC showed very weak statistically significant (p<0.05) Pearson's correlation (r=.153) with the 4th professional examination (Figure-1). No statistically significant correlation was found between SSC and any other professional examination (Table-2).

Table-2: Correlation between SSC and professional examinations

		1st Prof	2nd Prof	3rd Prof	4th Prof
SSC	Pearson Correlation	0.077	0.113	-0.025	**.153***
	Sig. (2-tailed)	0.293	0.124	0.735	0.037
	n	186	186	186	186

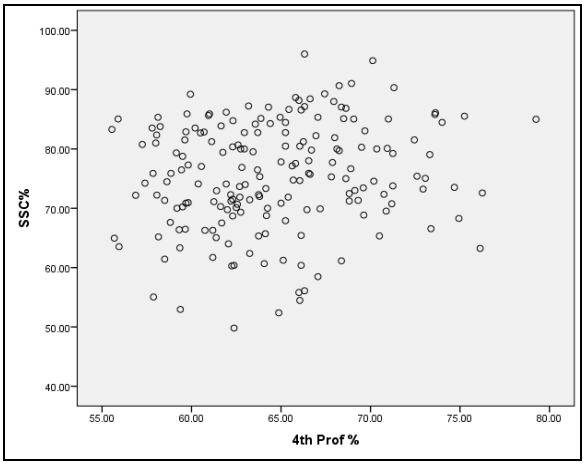

Figure-1: Scatter plot of SSC and 4th professional examination

b) HSC:

HSC showed very weak statistically significant (p<0.05) positive correlation with 1st (r=.150) and 2nd professional examinations (r=.161) (Figure-2 and 3). Correlations between HSC and the 3rd and 4th professional examinations were not statistically significant (Table-3).

Table-3: Correlation between HSC and professional examinations

		1st Prof	2nd Prof	3rd Prof	4th Prof
HSC	Pearson Correlation	**.150***	**.161***	0.139	0.119
	Sig. (2-tailed)	0.041	0.028	0.058	0.106
	n	186	186	186	186

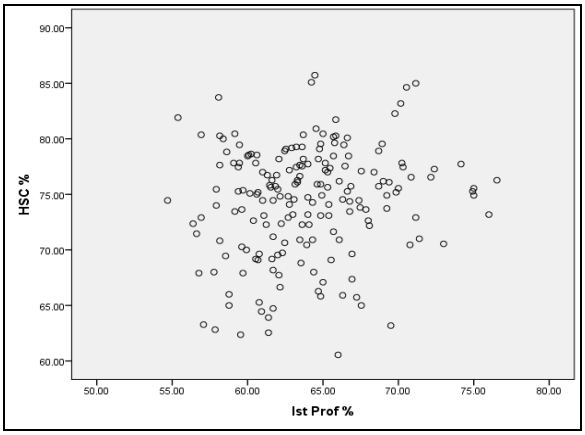

Figure-2: Scatter plot of HSC and 1st professional examination

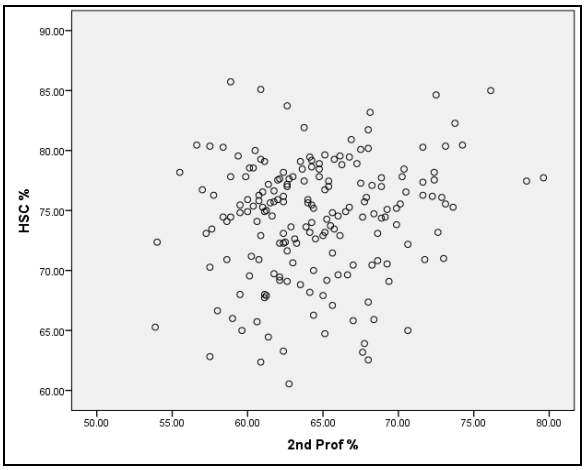

Figure-3: Scatter plot of HSC and 2nd professional examination

c)MDCAT:

MDCAT did not correlate with performance in any of the professional examinations (see Table 4). These included entrance tests conducted by ETEA and UHS.

Table-4: Correlation Between MDCAT and Professional Examinations

		1st Prof	2nd Prof	3rd Prof	4th Prof
MDCAT	Pearson Correlation	.161	.022	.039	-.012
	Sig. (2-tailed)	.078	.810	.671	.893
	N	121	121	121	121

The interviews analysed through thematic analysis identified three emerging themes (see Figure 4). The analysis was driven by the research questions of the study, using Braun & Clarke's (2006) six-phase framework. Therefore, it is a theoretical or top-down thematic analysis.[27] The process also involved peer reviews, constant feedback and working in groups to ensure rigour of the qualitative data.

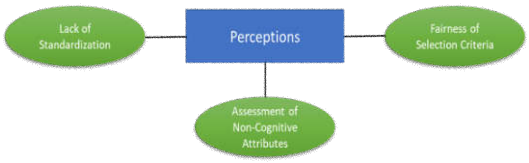

Figure-4: Emerging themes

a) Lack of Standardization:

Almost all the stakeholders identified a lack of standardization among different boards of education involved in SSC and HSC examinations and educational entities conducting MDCAT in different parts of the country.

"Different boards have different standards, which ultimately effects the merit of MBBS" (Yahya, HOD).

"I think some of the entrance tests are more lenient than others" (Saddam, Vice Principal).

"They are not the same. There's a lot of difference between ETEA, NTS and other tests" (Sadia, Student).

Participants thought that strict quality control measures should be taken to ensure standardization of the selection tools.

"We need to have strict quality control over various boards in different areas in SSC, HSC and government entrance tests…We have to standardize HSC examinations and the marking criteria" (Abbas, Administrator).

b) Fairness of Selection Criteria:

Most of the faculty members of WMC thought that the current selection criteria, which consist of a weighted combination of different selection tools, was fair.

"I think, majority of the stakeholders feel that this admission criteria is fair" (Saddam, Vice Principal).

"I had discussions with the staff members. Based on those discussions, I can say that this admission criteria is fair" (Yahya, HOD).

On the other hand, the student thought it was not a fair criterion because of the high weightage given to MDCAT.

"I think, HSC and SSC are okay but entry test, personally for me is not fair. Your lifetime of hard work on one side and those three hours decide whether you are capable of getting into a medical college or not" (Sadia, Student).

c) Assessment of Non-Cognitive Attributes:

Most of the participants suggested including an assessment of the non-cognitive attributes of the candidates.

"They should test our personality. We need leaders. Not everyone can act like a doctor. You need appropriate communication and leadership skills for that" (Sadia, Student).

"We also need to assess candidates' communication skills, confidence level, writing skills, interpersonal skills and thinking ability. These are essential characteristics of a good doctor" (Abbas, Administrator).

"One thing that PMDC and medical colleges need to consider are the interpersonal skills of candidates" (Saddam, Vice Principal).

The participants suggested conducting interviews to assess the non-cognitive attributes of candidates.

"We should have interviews and form a committee whose job should be to assess the qualities of candidates" (Sadia, Student).

"Candidates can be assessed in interviews whether they have the ability to become doctor" (Yahya, HOD).

"We have to take interviews to judge whether the candidate is capable of becoming a doctor or not" (Abbas, Administrator).

DISCUSSION

In other parts of the world, previous academic achievements are considered as one of the best selection tools for medical education because of their ability to predict student performance in medical college, especially in pre-clinical years.[3–5] However, contrary to one of the previous studies in Pakistan, this study found that SSC and HSC showed no to very weak correlation with performance in professional examinations.[6] This may be explained by the fact that the participants thought that the board of education examinations were not standardized, and the quality of education varied from one board to another.

In addition to previous academic achievements, entrance tests are widely used in different parts of the world e.g. UKCAT, MCAT and GAMSAT. These have shown varying ability to predict performance in medical college.[5,11–13] In Pakistan, MDCAT is utilized as a selection tool, and conducted by different government educational entities in different regions (ETEA, UHS, NTS and HEC). In this study, MDCAT results showed no statistically significant correlation with performance in any of the professional examinations. Furthermore, many of the participants believed that these tests vary from one province to another and there is a need for standardization across the country.

To improve the current admissions process, the stakeholders suggested including interviews to assess the non-cognitive attributes of the candidates. However, previous studies report low validity and reliability of traditional interviews.[14–16] Nonetheless, Multiple Mini Interviews (MMI) has shown better validity and reliability in recent studies.[12,17–19] Participants reported that interpersonal skills, leadership skills, communication skills, level of confidence, enthusiasm and interest in the field are some of the non-cognitive attributes which need to be assessed during the selection process. This need has also been recognized in a number of recent studies worldwide, demonstrating the importance of assessment of non-cognitive attributes for admissions to medical colleges.[20,21] Moreover, research shows that these attributes can have an impact on the performance of students in medical college.[21]

Most of the participants in this study thought that the current selection criteria recommended by PMDC were fair, except a student, who thought that MDCAT was given more weight than it deserved. Similar to one previous study in Pakistan, standardization of board of education examinations

(SSC and HSC) and MDCAT was the main concern identified by the stakeholders in this study.[7] Moreover, the selection tools poorly predicted the academic achievements of students in medical college. The participants recommended including assessment of non-cognitive attributes and standardizing SSC, HSC and MDCAT across Pakistan, believing these actions would enhance the selection process for medical education.

CONCLUSION

The selection tools used for MBBS in WMC showed poor predictive validity for the students' subsequent performance in professional examinations. The participants identified that the selection tools utilized for admissions in medical colleges in Pakistan were not standardized and strict quality control measures should be taken for standardization. The stakeholders also identified that the current selection process lacks assessment of non-cognitive attributes and interviews should be incorporated to augment the selection criteria.

AUTHORS' CONTRIBUTION

MAQ: Study conceptualization, literature review, data collection and analysis, ethical approval and write up. JA: Quantitative data collection, cleaning and analysis, and proof-reading. MM: Devised study methodology, helped develop interview guide, qualitative data interpretation, proof-reading and final write-up.

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