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Development of medical aptitude amongst fresh medical entrants by way of relevant teaching learning sessions: a cross sectional pre-post study

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ABSTRACT

Background: Medical Science is still one of the most sought after professions. The possession of an aptitude for the profession is a pre requisite, considering its strenuous demands from the candidate. Presently, there is no mechanism in place in India to assess aptitude in students prior to medical college entry. The aims and objectives of the study were to assess the baseline medical aptitude in the new medical entrants, to Introduce Teaching Learning Sessions for Development of Medical Aptitude in new Medical Entrants, to assess the post T/L session medical aptitude in the new medical entrants.

Methods: A cross sectional, one group pre- post study was undertaken amongst 150 fresh MBBS students of Adesh Medical College and Hospital, Shahabad, after approval from the IEC. A pre-tested and pre-validated semi-structured questionnaire was used for data collection both at baseline and after relevant Teaching learning sessions. Data collected was analyzed by using Statistical package for social sciences (SPSS) Version 21.

Results: The overall mean aptitude value before and after the T/L session was 102.98 ± 8.47 and 114.51 ± 8.60 respectively (p<0.001). Also, there was increase in the proportion of students having average and above average aptitude and decline in those having below average aptitude in the post T/L sessions as compared to the baseline levels.

Conclusions: It can be concluded that medical aptitude can be built up in the new medical entrants by making them aware about it through well crafted teaching learning sessions.

Keywords: Medical aptitude, New medical entrants, Teaching-learning sessions, Pre-post study

INTRODUCTION

Medical Science is still one of the most sought after professions.¹ The popularity can be attributed to several reasons ranging from a willingness to serve humanity through the profession, parental influence, influence from peers and relatives, acquisition of high social status, prestige associated with the profession and respect and honour accorded to the profession.²⁻⁷

Medical Science requires the candidate to have adequate intra and inter personal skills, a flexible approach to arrive at decisions, professionalism and an indomitable zeal to strive under stringent conditions apart from possessing academic and clinical mastery of the subject. Also needed are attributes such as general mental ability, critical thinking, problem solving, communication skills, empathy, psychological robustness and integrity. 8

Though it has been considered that the possession of an aptitude for the profession is a pre requisite, considering its strenuous demands from the candidate, a comprehensive assessment of these areas under the construct of medical

aptitude has not been analyzed so far, though medical aptitude has been socially defined.¹

Freeman defined aptitude as 'a combination of characteristics indicative of an individual's capacity to acquire training or some specific knowledge, skill, understanding or set of organized responses'. Lack of aptitude leads to improper learning, dissatisfaction, apathetic attitude towards patients, lack of ethics and improper communication. All this translates into poor patient care in the future and unhealthy doctor patient relationship.

Not only this, 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. ¹⁰⁻¹¹ Therefore, it may very well be stated that having the right kind of aptitude in the students pursuing this program will decrease the drop- out rates, improve the efficiency of the program and the quality of its product. ¹²

At present, there is no mechanism in place in India to assess aptitude in students prior to medical college entry. It could therefore be conducted amongst those who gain admission in medical colleges so that those lacking the required aptitude get a chance to build upon it and thereby become fit to practice medicine on completion of their undergraduate course.

Aim and objectives

Introduction of teaching learning sessions for development of medical aptitude in new medical entrants which will enable them to become well rounded Indian medical graduates.

Objectives

To assess the baseline medical aptitude in the new medical entrants.

To introduce Teaching Learning Sessions for development of medical aptitude in new medical entrants.

To assess the post T/L session medical aptitude in the new medical entrants.

METHODS

Study design

The study design was cross sectional study (one group prepost design).

Study setting

The study was conducted on 1st year MBBS students of Adesh Medical College and Hospital, Shahabad (M), Kurukshetra.

Study subjects

A total of 150 MBBS Students of 2019 Batch were included in the study.

Study period

The data for this study was collected from October 2019 to January 2020.

Sample size

The sample size was 150 new Medical entrants of 2019 Batch.

Sampling technique

The sample technique was convenience sampling.

Data collection tools

Pre-tested semi-structured questionnaire for aptitude assessment of students before and after the T/L sessions.

A semi- structured questionnaire, along the lines of a construct of medical aptitude, was designed for the students based on an in-depth literature review of the topic. The questionnaire comprised of 2 items regarding age and sex of the students and 34 items, comprising of both positively and negatively constructed statements, regarding their possession or otherwise of medical aptitude. The responses to these items were based on a five-point Likert scale, 'strongly disagree', disagree, neither agree nor disagree, agree and strongly agree. All positive items were coded as such while all negative items were reverse coded for analysis. Item Nos. 3, 5, 11,15,19, 21, 23, 26, 28, 30,32 and 34 were negatively phrased therefore they were reverse coded. To ensure the validity of the questionnaire, the guidance of senior department faculty and experts was sought while drafting the questions.

Thereafter, a pilot study was conducted. Based on the results of the pilot study, essential modifications were made in the main questionnaire. The reliability coefficient of the modified questionnaire was tested using Cronbach's alpha which was found to be 0.75. Thus, reliability of the questionnaire was also ensured. It was planned to use the same questionnaire for collecting baseline data as well as data after the cessation of Teaching-learning sessions (T/L sessions) on medical aptitude.

The new batch of recently joined 150 MBBS students were then invited to take part in the study. They were given an idea about the study and its importance and usefulness for them. They were also requested to be thoughtful and honest about their responses. After obtaining informed consent, baseline aptitude data was collected from all the students who were present on that day. Message was passed on to the few absent students to participate in the

study on the following day. Thus baseline data was procured from all the 150 students.

Following this data collection, 8 Teaching Learning Sessions spanning over a period of 2 months, were conducted for the students to create awareness and build knowledge regarding medical aptitude. The sessions included interactive lectures as well as video demonstrations. There was a weekly 1 hour T/L session which consisted of both the interactive lecture as well as 1 video demonstration. After a thorough literature search, 8 articles were shortlisted which clearly brought out the essential aptitude required in a medical professional. These were discussed one by one with the students in the T/L sessions. Video demonstrations followed the interactive lectures and involved showing videos of what are the chief aptitudes required in doctors commented upon by few top doctors of India and Western countries.

At the end of these sessions, data was again collected from the students by using the same questionnaire which was used to collect the baseline data. The students were briefed that they would have to comment upon the items based on whether they had started improving or learning to be good in those things or how they perceived themselves after the T/L sessions. For example, for an item like "I am good at decision making", in the baseline questionnaire the student would answer their actual status regarding this query. For the same item in the post T/L session questionnaire, the student would respond as to how much they were learning to be good in this domain or not or were neutral to it. For items like whether "willingness to serve humanity is the most important motivation for them to become a doctor", in the baseline questionnaire the student would answer

their actual status regarding this query while in the post T/L session questionnaire, the student would respond as to how they perceived themselves after the T/L sessions regarding such type of query. The responses for each of the items, both at baseline as well as after T/L sessions, was recorded on the five point Likert scale and the proportion of students in each of the points in the scale was computed for both the times.

Statistical analysis

Data collected was entered into Microsoft Excel worksheet and was analyzed by using Statistical package for social sciences (SPSS) Version 21. Qualitative variables are presented in percentages and chi-square test was applied. Quantitative variables are presented in mean and standard deviation. In order to test the effectiveness of Teaching Learning sessions among medical students, paired t- test was used. P<0.01 and <0.05 were considered highly significant and significant respectively.

Ethical issue involved in study

Ethical approval for this study was provided by the Institutional Ethics Committee (IEC) of Adesh Medical College and Hospital. Informed consent was taken from all the participants before their participation in the study.

RESULTS

The study comprised of 150 1st year MBBS students. Female students comprised of 46% whereas the remaining 54% were males.

Gender Males Age in **Females Total** years Numbers **%** Number % Number % <20 52 7.4 52 64.2 104 69.3 >20 17 29 46 24.6 35.8 30.7 Total 69 100.0 81 100.0 150 100.0

Table 1: Age and Sex wise distribution of the study participants.

Table 2: Comparison of medical aptitude of the students before and after the teaching-learning sessions.

S. no.	Characteristics / Variables		N	Mean	SD	P - value	t-value
1.	Willingness to serve humanity	Pre	150	2.87	1.36	<0.001*	-10.24
		Post	150	4.19	0.85		
2.	Willing to forsake my consultation fees for poor patients	Pre	150	3.03	1.47	<0.001*	-9.66
		Post	150	4.25	0.85		
3.	Not believe in life long learning	Pre	150	3.27	1.50	<0.001*	9.22
		Post	150	1.84	1.14		
4.	Good at decision making	Pre	150	3.13	1.24	<0.001*	-10.37
		Post	150	4.13	0.64		
5.	Not good in performing practical work	Pre	150	2.95	1.43	<0.001*	6.26
		Post	150	2.07	1.06		
6.	I have good observation skills	Pre	150	3.27	1.24	<0.001*	-10.62
		Post	150	4.27	0.62		

Continued.

S. no.	Characteristics / Variables		N	Mean	SD	P - value	t-value
7.	I study a lot and work hard regularly	Pre	150	2.91	1.05	<0.001*	-6.57
		Post	150	3.41	0.99		
8.	I regularly participate in sports	Pre	150	2.90	1.33	<0.001*	-8.25
0.	regularly participate in sports	Post	150	3.70	1.12		
9.	I regularly participate in extra-curricular activities.	Pre	150	2.87	1.39	<0.001*	-4.03
		Post	150	3.35	1.04		
10.	I take care of my own health.	Pre	150	2.59	1.27	<0.001*	-8.42
		Post	150	3.70	1.09		
11.	I take care of the health of my family members.	Pre	150	3.07	1.46	<0.001*	-8.97
		Post	150	4.25	0.72		0.57
12.	I have good memorizing skills.	Pre	150	3.19	1.17	<0.001*	-8.76
121		Post	150	3.87	0.80		-0.70
13.	Good at providing comfort to anybody needing it.	Pre	150	3.21	1.39	<0.001*	-7.56
10.	- Cood at providing comfort to anybody needing it.	Post	150	4.12	0.82	10.001	
14.	I do not enjoy being in a team.	Pre	150	3.03	1.56	<0.001*	3.90
		Post	150	2.37	1.22	10.001	
15.	Possess respect to authority.	Pre	150	3.89	1.08	<0.001*	-3.49
		Post	150	4.17	0.67		
16.	I do not try to analyze things.	Pre	150	2.77	1.32	<0.001*	6.15
		Post	150	1.98	0.95		
17.	Able to feel other people's emotions.	Pre	150	3.01	1.47	<0.001*	-10.64
	1 1	Post	150	4.31	0.73		
18.	I reflect on things before acting.	Pre	150	3.21	1.05	<0.001*	-7.66
40		Post	150	3.85	0.87		
19.	I am a quick learner.	Pre	150	3.05	1.14	<0.001*	-8.30 -7.81
		Post	150	3.72	0.91		
20.	Make a note of the body language during communication with others.	Pre	150	2.92 3.92	1.54 0.96	<0.001*	
21	with others.	Post Pre	150 150	3.92	1.34		
21.	Good listener.	Post	150	4.09	0.79	<0.001*	-7.63
	Believe that emotions has no role in the treatment of disease.	Pre	150	3.10	1.54	<0.001*	4.52
22.		Post	150	2.29	1.42		
23.	Able to apply knowledge appropriately.	Pre	150	2.29	1.42	<0.001*	-8.88
		Post	150	3.89	0.74		
	I only do morally right things.	Pre	150	3.03	1.13	<0.001*	-5.88
24.		Post	150	3.57	0.96		
		Pre	150	102.98	8.47	<0.001*	-14.60
	Total	Post	150	114.51	8.60		
	* P value significant at 1% level of significance	1 050	150	11 1.01	0.00		
	1 value dignificant at 170 to 101 of dignificance						

Table 3: Level of aptitude at baseline and post T/L sessions.

Time of assessment of medical	Proportion of students with Medical Aptitude					
aptitude	Below Average	Average	Above average			
Baseline	19.3%	69.3%	11.3%			
Post T/L sessions	12%	74.7%	13.3%			
Overall aptitude	Mean±SD	P value				
Baseline	102.98 ± 8.47	(0.001 (mained + test)				
Post T/L sessions	114.51 ± 8.60	<0.001 (paired t-test)				

In the Table 2, out of 34 items, only the ones (24) having a statistically significant outcome in the Post –test outcome as compared to Pre-test have been included.

The medical aptitude present in the students was divided into 3 categories: below average, average and above average. To obtain the above 3 categories for the

interpretation of medical aptitude among students at the baseline level, the Standard Deviation value of 8.47 was added and subtracted from the mean value (102.98) which comes to be <94.51: below average, 94.51-111.45: average, >111.45: above average. To obtain the above 3 categories for the interpretation of medical aptitude among students after the T/L sessions, the Standard Deviation value of 8.60 was added and subtracted from the mean value (114.51) which comes to be <105.91: below average, 105.91-123.11: average, >123.11: above average.

The overall average aptitude before the T/L session was 102.98±8.47 and after T/L session was 114.51±8.60 and this was found to be a statistically highly significant difference (p<0.001). Thus, an overall significant improvement in the medical aptitude of the students after undergoing the teaching learning sessions was found.

DISCUSSION

At the outset, we would like to state that not very many studies have been undertaken in this arena. This was a novel attempt by the authors to explore the effectiveness of an aptitude building exercise amongst medical students. However, many earlier studies have tried to explore what motivates the students to choose medicine as a profession.

In our study, there were 46% female students and 54% male students. Miller et al in a study in the United Kingdom also showed an increase in feminisation of the medical profession.¹³ According to Bathala et al among the newly joined medical students, females (57.25%) were more than males (42.75%).¹⁴

In our study, a total of 34.6% of the students equally agreed (17.3%) and strongly agreed (17.3%) about willingness to serve humanity as the most important motivation for them to become a doctor. According to Horton one of the the core values of the medical profession is altruism.15 McManus et al reported that one of the generic motivations of medical students was helping people. 16 Ferrinho et al in their study found out that 37% of the students expressed that the main reasons to choose medicine as a profession were "to contribute to the welfare of the public". According to Saad et al 51% of the students strongly believed and 41% moderately believed service to humanity as a motivating factor for choosing medicine as a profession.⁶ Riska et al also found altruism and a sense of helping mankind to be the common factor among many medical students.¹⁷ Salpekar et al in their study on Aptitude evaluation for medical profession in first and final year M.B.B.S. students have observed a few attributes for a good doctor two of which are service over economics, selfless service motto and ability to work relentlessly for the patients.¹⁸

In our study, a total of 46.7% of the students agreed (26%) and strongly agreed (20.7%) that they were willing to forsake their consultation fees for the poor patients. This is similar to the findings of Saad et al who in their study

found that for only 52% students, monetary reward was one of the considerations and that students still believed in the core values of this profession and money was not their only priority. ¹⁶

In this study, 48% of the students agreed to be good in decision making, 40.6% agreed to not being able to stay calm in stressful situations and 56% of the students agreed to believing in life-long learning. Cenkseven et al in their study observed that there are some requirements which the medical student should possess, such as decision making, dedication to lifelong learning, as well as ability to cope with stress. ¹⁹ According to Padmanabhan et al skills in decision-making need to be developed in medical graduates. ²⁰

In our study a total of 38% of the students agreed (25.3%) and strongly agreed (12.7%) to being fluent in English. This is somewhat similar to the findings of Salpekar et al who in their study found 14% of the undergraduates have High, English Language skills and 42% of the students have average English language skills.¹⁸ In a study by Bathala et al 95.42% of participants opined that English language should be there in curriculum while only 4.58% of participants opined that it is not required as already many subjects are there in curriculum. 14 Cenkseven et al in their study observed that after the decision of choosing MBBS as a course of study, there are some requirements which the medical student should possess, such as comprehension of English language. 19 Padmanabhan et al have highlighted that the medical student should be able to reasonably understand the English language apart from being competent in communication.²⁰

In our study 47.4% of the students agreed to have good observation skills. In this study 20.7% of the students agreed to lacking foresight. Durkin in an article based on a validation study of 70 professional doctors, highlighted a keen sense of observation as an essential aptitude that a doctor must possess along with presence of foresight.²¹

In our study, a total of 39.3% of the students, agreed (25.3%) and strongly agreed (14%) that they regularly participated in sports. In a study by Bathala et al 96.95% of participants mentioned that sports should be part of curriculum to alleviate stress, promote both physical and mental health it also helps them to stay away from electronic gadgets to which youth has become addicted.¹⁴

In our study,44.7% of the students agreed to being able to feel other people's emotions. According to Albanese et al compassion is a very desirable personality trait for a doctor.²² According to Horton compassion is one of the the core values of the medical profession.¹⁵ Nicholson also emphasized that attributes such as empathy and psychological robustness is an important required quality of medical students.⁸ Cenkseven et al in their study observed that medical student should possess empathy.¹⁹ Salpekar et al in their study have also observed empathy as a truly necessary factor for becoming a good doctor.¹⁸

In our study, 39.3% students agreed that they were not good in solving problems. Verma et al reported that most of the Indian Medical Graduates are often found inept in problem solving skills.²³ Nicholson in a commentary on the benefits of aptitude testing for selecting medical students emphasized that attributes such as problem solving is an important required quality of medical students.⁸ Sood et al, Chandramohan and Kumar et al have also reported that, despite Indian medical graduates possessing essential knowledge of medical science, they are often found to be lacking in skills such as problem-solving.²⁴⁻²⁶ Padmanabhan et al also have highlighted that problem solving skill need to be developed in medical graduates.²⁰

In our study, 46.7% of the students agreed that they did not enjoy being in a team and only 39.3% of the students agreed to doing only morally right things. According to Albanese et al medical schools must select applicants who will not only excel academically but also possess personality traits befitting a career in medicine such as team working skills and integrity.²² According to Horton some of the core values of the medical profession are integrity and team work.¹⁵ Cenkseven et al in their study observed that after the decision of choosing MBBS as a course of study, integrity is a definite requirement for a medical student.¹⁹

Limitations

Due to time constraint, the aptitude build up exercise could be taken up for a short duration of only 2 months. Please rewrite as ... Again, due to limited time at our disposal, the effectiveness of T/L sessions on the performance of the students could not be evaluated objectively and this area remained largely self reported by the students.

CONCLUSION

It can be concluded from our study that aptitude is to a large extent amenable to improvement or increase through well designed aptitude build up teaching learning sessions. As the MCI's/NMC's goal is to produce competent Indian Medical Graduates, an exercise of this sort could be sought as aptitude influences attitude which in turn can make or mar the competence levels of a future doctor. Moreover, possession of a "doctorly aptitude" could lead to improvement in the doctor patient relationship as well as the quality of medical care.

Recommendation

In reality, as medical profession is highly demanding, it is imperative that people with the right aptitude be selected for this profession. Thus, the selection process should be so designed so as to have an assessment of the possession or otherwise of medical aptitude. Only those found to possess the aptitude should be given admission to the medical undergraduate course. Since at present this may sound like a far fetched approach in a developing country

like India with its teeming population, at least an aptitude build up exercise should be taken up as brought out in this study. These T/L sessions should not be restricted to just once but also undertaken more frequently maybe once every professional year during MBBS to refresh the ingredients of medical aptitude in the students' minds. Further research in this area is also recommended.

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