

# An assessment of the Learning Mode Preference of Undergraduate Medical Students of Moti Lal Nehru Medical College, Allahabad

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## ABSTRACT

**Objective**-The aim of this study is to determine the learning mode preferences of undergraduate medical students of Moti Lal Nehru Medical College, Allahabad, Uttar Pradesh, India.

**Methodology**-This study was conducted among 140 undergraduate medical students. A validated VARK questionnaire was used to determine the learning mode preference of these students. The questionnaire consisted of 16 items to analyze the classification of learning mode preference as- Visual, Auditory, Read/ Write, Kinesthetic (VARK) or combination of these. Descriptive analysis was used to identify the learning mode preference of the participants.

**Results** -The analysis showed that 55% participants preferred multimodal learning as compared to 45% who were found to be unimodal learners. Among the unimodal kinesthetic (K) learners were maximum and among the multimodal learnersquad- modal (VARK) outnumbered the rest. Cumulative analysis of these learning modes further shows the predominance of kinesthetic learning followed the rest.

**Conclusion** - This study points to a varied preference of learning modality among the students. This shows that the teaching and learning methodology should be such that it caters to all type of learners. Based on the higher preference of kinesthetic learning among the study participants it should be incorporated in the teaching learning activities for the benefit of the students. Also the students should be encouraged to be receptive to other methods as well.

**Key words**-learning mode preference, learning styles, VARK, unimodal and multimodal learners, teaching and learning methodology

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## Introduction-

Learning modality preference is one of the many other components of learning style which determine the person's ability to acquire new knowledge. It is a part of one of the dimensions of the complex system of preferences that make up a person's learning style.<sup>1</sup> Learning style is defined as 'the composite characteristic cognitive, affective and physiological characters that serve as relative stable indicators of how a learner perceives.'<sup>2, 3</sup> Learning mode preference refers to the physiological sensory modality in which people expect information to come to them and the ways in which they prefer to deliver their communication.

Medical students have multiple tasks of acquiring theoretical knowledge, gaining practical skills and developing right attitude. They are in turn assisted by the medical educationists through different strategies to become good doctors one of which is the identification of learning mode preference in the medical students.<sup>13</sup> A medical student is supposed to be a lifelong learner and it helps if he is aware of his learning style. There needs to be a constructive alignment of learning outcome, teaching methodology and assessment technique in order to have a successful curriculum planning. Hence it is very useful if the tutor is aware of the preferred learning mode of an individual student as well as predominant learning preference of the class. Studies has revealed that most of the medical students experience learning difficulty at one time or the other during their training.<sup>11</sup> It has been observed that if the students received instruction in their preferred learning mode than they would learn faster.

Medical curriculum utilizes various teaching learning methodologies that individually characterize exclusive stimulation for certain sensory modalities. Four sensory modalities have been described by Fleming: Visual (V), Aural (A), Reading/Writing (R) and Kinesthetic (K) collectively called VARK.<sup>4</sup> Visual learners are those who prefer to gather information in the form of pictures. Hence they learn easily with the aid of maps, charts, graphs and other visual tools. Aural learners gather information by listening. Reading/ writing learners assimilate new information by reading and writing. Kinesthetic learners utilize physical experiences to learn new things using many sensory modalities like somatosensory, auditory, olfactory, gustatory and visual.<sup>5</sup> Some individuals use more than one learning modalities as well hence, they can be either unimodal or multimodal.

Neil Fleming, an educator from New Zealand developed a questionnaire to determine learning modality preference known as VARK questionnaire ( abbreviation for Visual, auditory, Read/write, kinesthetic) that can help classify individuals into different categories of unimodal and multimodal learners.<sup>6,7</sup> This simple questionnaire has been widely used to help students in identifying their learning preference and to make teachers aware of the diversity of learning preferences among the students.<sup>8</sup> Various studies have verified the validity and reliability of this questionnaire (English version).<sup>9</sup> Similarly VARK questionnaire has been used to determine learning style preference of medical students in many countries too in recent past.<sup>10</sup>

Moti Lal Nehru medical College, Allahabad, is one of the oldest colleges of the country and like all other colleges of the country its curriculum is regulated by the Medical Council of India. Students who take admission in this college are mostly from all over Uttar Pradesh and they belong to different socio economic classes. A need was felt to conduct this study on the pattern of learning mode preference among the undergraduate students of first and second year the result of which would assist and guide faculty and administration of medical colleges in general to facilitate the students to learn effectively.

#### **Research Methodology:**

- **Study Design**

This is a descriptive, cross sectional study of the prevalence of learning preference among medical students. It consists of:

- An interview based questionnaire administered to the participant and the responses entered by the interviewee.

- **Study Setting**

This study was conducted in Moti Lal Nehru medical College, Allahabad, Uttar Pradesh, India.

- **Target Population**

It included all the first and second MBBS students who had volunteered for participating in this study.

- **Sample Size:**

A total of 140 students participated in this study and all of them successfully completed the questionnaire during data collection.

- **Duration of the study**

The data collection took around one month to be completed as planned.

- **Sampling Technique**

The study was done by complete enumeration method whereby all the students studying in the first and second MBBS were included in the study.

- **Instrument of Data Collection**

The data was collected by the use of:

- ✓ A pre – tested, structured and close ended questionnaire administered by the investigators to the study participants.
- ✓ The instrument we used for the study was version 7.8 of VARK questionnaire.
- ✓ The purpose of this questionnaire is to determine the learning mode preference in terms of visual, aural, read/write, kinesthetic or a combination of these.
- ✓ This questionnaire consisted of 16 items and each item was followed by four options.

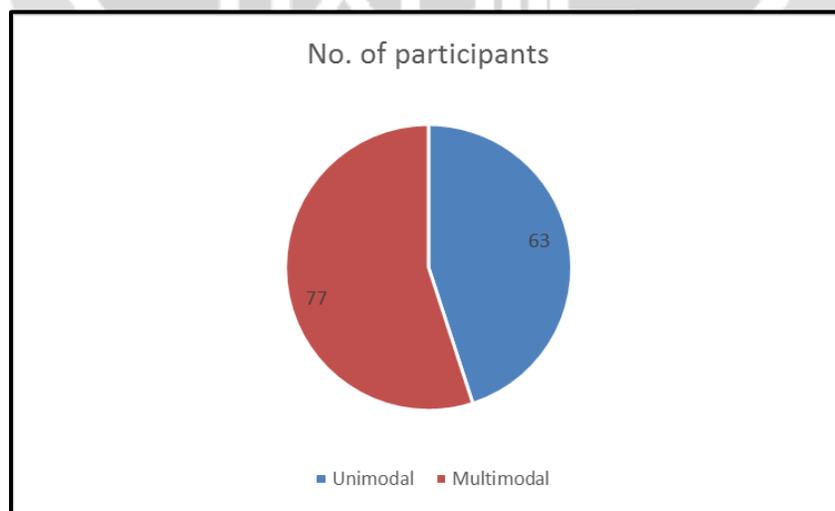
- ✓ The students were clearly communicated that they can opt for more than one option for the given items if they find appropriate.
  - ✓ All the explanation and instructions to the students were given by the same investigator in each of the group of students.
- **Data Analysis**
    - ✓ The learning mode preference of each student was determined according to the guidelines provided in the VARK website.<sup>12</sup>
    - ✓ Descriptive statistics was used to analyze the pattern of distribution of different learning mode preferences.
  - **Ethical Considerations**
    - ✓ Prior ethical approval was taken from the research committee of Moti lal Nehru Medical College, Allahabad, Uttar Pradesh.
    - ✓ Participation consent from the students was taken. They were also briefed about the advantages to them as well as to the student community due to their participation. The students were assured that all information will be kept purely confidential and will only be used for the purpose of statistical analysis.
  - **Limitations**
    - ✓ Interviewee bias cannot be ruled out since the data collection was primarily through filling up of the given questionnaire.
    - ✓ Given the time frame of the study period it was not possible to include more participants.
  - **Inclusion and exclusion criteria**
    - ✓ All the students studying in the first and second MBBS were included in the study.
    - ✓ Any student who voluntarily wanted to leave either in the beginning or during the study was excluded.

## Results

The response rate in this study was 100%; i.e. all the 140 students involved in the study completed their questionnaires. The analysis of the completed questionnaire showed varied type of learning mode preferences among the students.

The outcome displayed below (fig 1) showed that the overall preference among the students (total = 140) for multimodal learning was 55.0% (=77) while unimodal learning was preferred by 45.0% (=63) in the study sample.

**Figure 1**



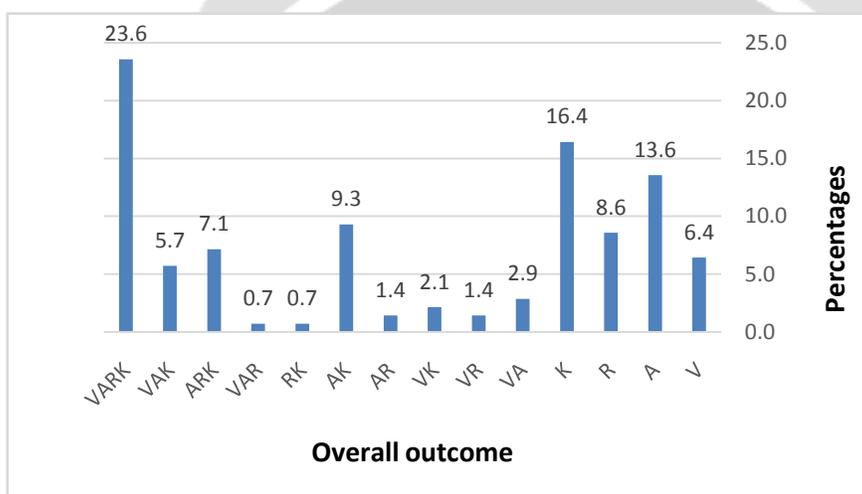
A detailed assessment of the students preferring unimodal distribution (table 1) showed that about 36.5% favored the kinesthetic modality while 30.2% favored aural modality.

(Table 1)

Type of Modalities	S.No.	Modalities	No. of participants	Percentage
Unimodal distribution	1	V	9	14.2
	2	A	19	30.2
	3	R	12	19.1
	4	K	23	36.5
Total			63	100

This questionnaire classified students' learning mode preference into fourteen categories with quad modal VARK (23.6%) amounting for maximum (figure 2)

Figure-2



Among the 77 multimodal students assessed during the study (Table 2), it was found that most of them preferred the quad modal distribution VARK (42.9%), followed by the bimodal distribution (32.5%) and the Tri-modal distribution (24.7%)

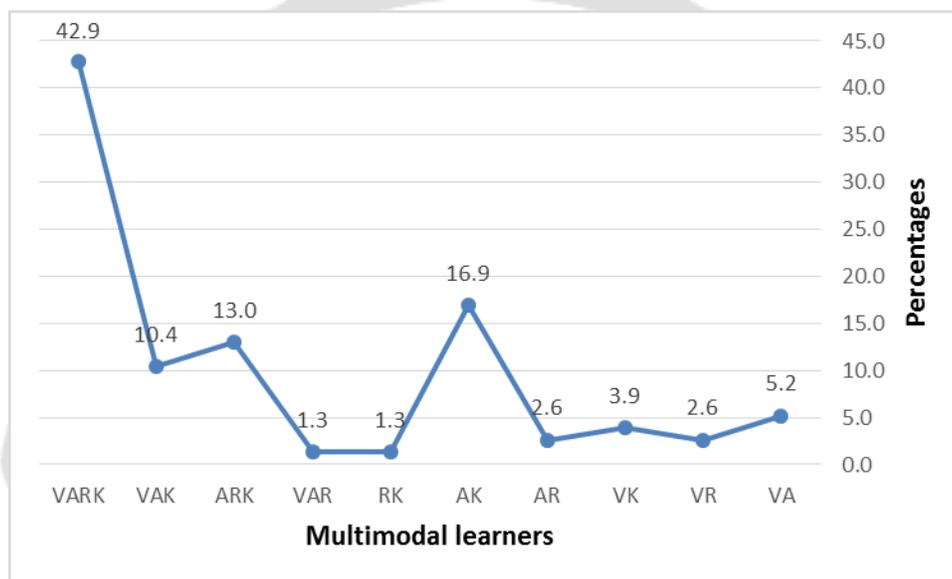
Table 2-multimodal learning mode preferences

Type of Modalities	S. No.	Modalities	No. of participants	percentage	
Multimodal distribution	Bimodal distribution 25 (32.5%)	1	VA	4	5.2
		2	VR	2	2.6
		3	VK	3	3.9
		4	AR	2	2.6
		5	AK	13	16.9
		6	RK	1	1.3

Trimodal distribution 19 (24.7%)	7	VAR	1	1.3
	8	ARK	10	13.0
	9	VAK	8	10.4
Quad-modal distribution 33 (42.9%)	10	VARK	33	42.9
Total			77	100.0

Learning modality ARK is the most preferred among the tri-modal category whereas AK is most prevalent in the bimodal category.

Figure - 3



It is observed (Table 3) (Figure – 4, 5, 6, 7) that kinesthetic mode seems to be preferred by most of the students either alone or in combination with other modes as seen in this study.

Table - 3 – number and percentage distribution of different learning mode preferences

LEARNING PREFERENCE	MODE	NUMBER	PERCENTAGE
V		9	6.4
A		19	13.6
R		12	8.6
K		23	16.4
VA		4	2.9
VR		2	1.4
VK		3	2.1
AR		2	1.4
AK		13	9.3
RK		1	0.7
VAR		1	0.7
ARK		10	7.1

VAK	8	5.7
VARK	33	23.6

Figure - 4

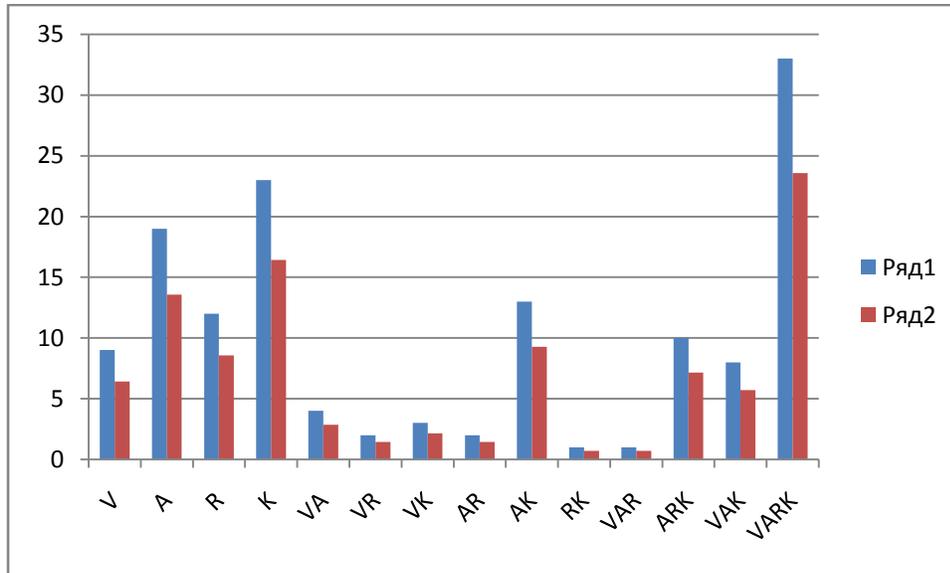
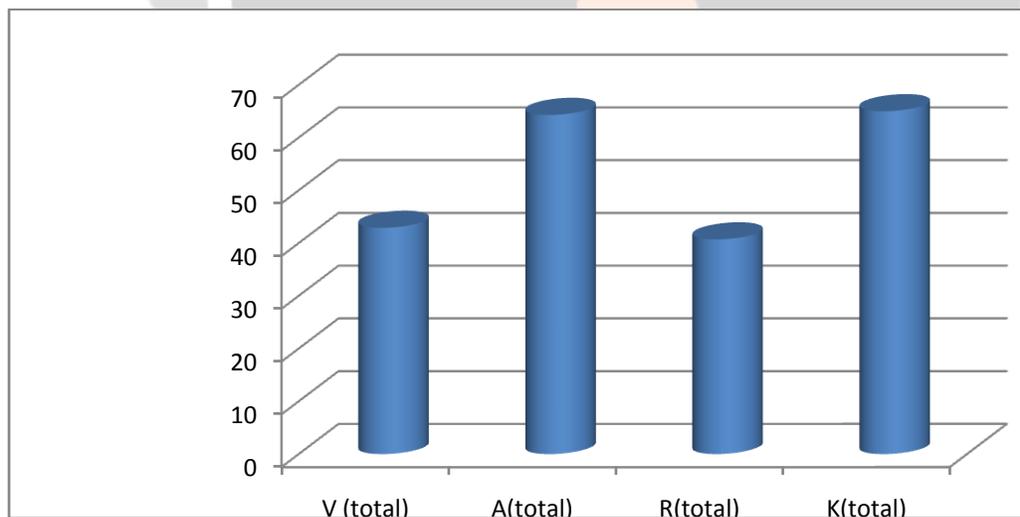
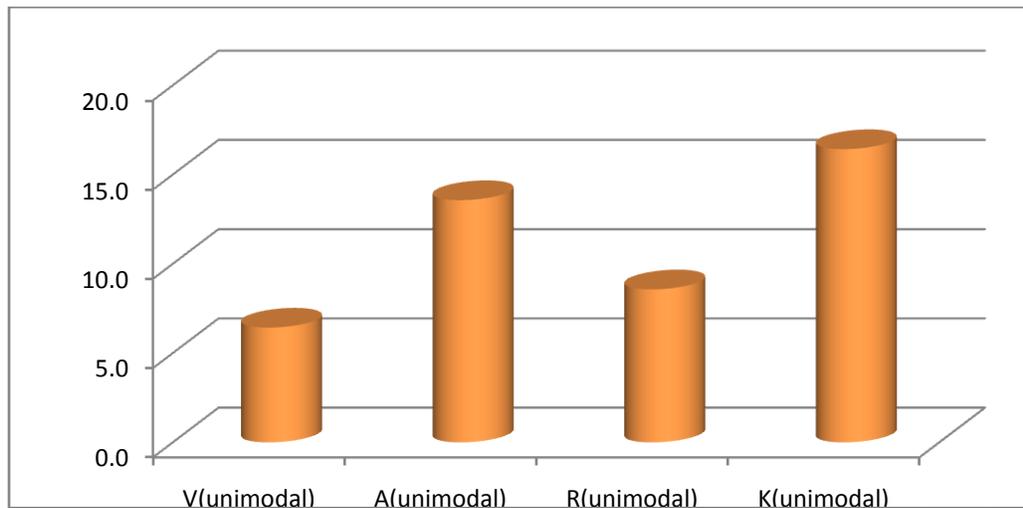


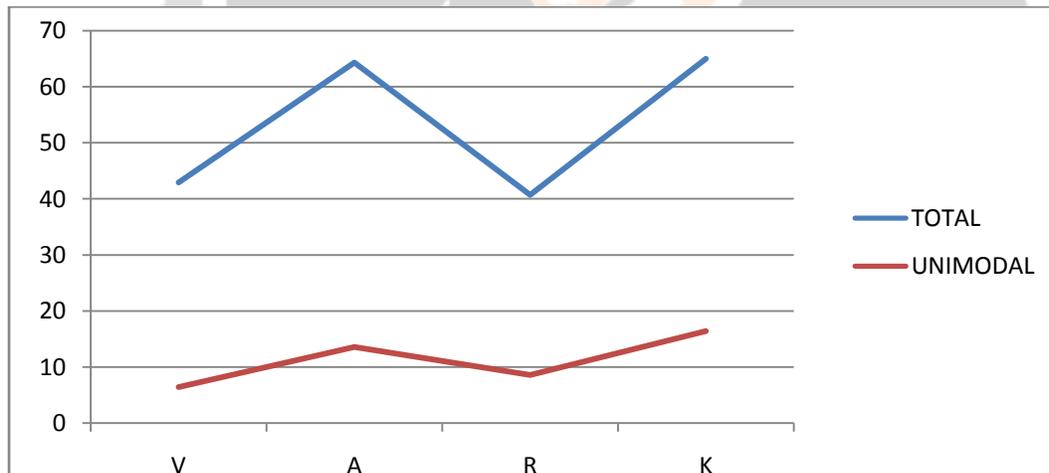
Figure - 5



**Figure - 6**



**Figure - 7**



The predominance of kinesthetic and aural mode of learning emphasizes the importance of practical's and lectures in the MBBS curriculum

**DISCUSSION**

This study was conducted in MLN Medical College Allahabad, U.P., India .VARK questionnaire was used to determine the pattern of learning mode behavior in undergraduate medical students. The findings of this study will hopefully help a great deal in leading to an improvement of the existing teaching and learning methodology.

This study revealed that multimodal (55%) learning preference outnumbered the unimodal (45%) learning preference. Within the multimodal learning quad-modal (42.9%) was most common while in unimodal learning kinesthetic (36.5) was most prevalent followed by aural mode (30.2).

The cumulative (total) analysis of the unimodal and multimodal learning preference further showed the prevalence of kinesthetic(65%) followed by aural (64.3%) learning. This is similar to the pattern found in unimodal preference where also we found that kinesthetic(36.5) was followed by aural(30.2). mode of learning preference. The largest group in bimodal preference is aural- kinesthetic(AK) with 9.3% and largest group in trimodal learning is aural-read-kinesthetic(ARK) with 13.0%.

Thus it is very clear from this study that these undergraduate medical students are mostly multimodal learners and have considerable preference for kinesthetic learning which is supported in unimodal analysis as well as cumulative analysis. These findings of our study are supported by several other studies done earlier. Though huge number of studies has shown the prevalence of multimodal and kinesthetic learning separately, we are going here to discuss only those cases where dominance of multimodal and kinesthetic learning are found together.

Kharb et al(2013) in their study on learning style in first year medical students found that 61% were multimodal learners and the most common unimodal learning preference was kinesthetic.<sup>14</sup> Two other such studies done in first year medical students by Baykan & Nacar (2007)<sup>15</sup> and Lujan & Dicarolo(2006)<sup>16</sup> came out with the finding that multimodal learners outnumbered unimodal learners and kinesthetic learning was most common unimodal learning preference.

A study done in medical students of clinical phase in Malaysia discovered that there were more multimodal(56%) compared to unimodal(44%) learners and kinesthetic learning was most common in unimodal learners.<sup>17</sup> Such studies have been performed in various other parts of the world with similar result .Hamouzadeh et al<sup>18</sup> in Iran, Ubah JN<sup>19</sup> in Nigera, Ramirez BU<sup>20</sup> in South America and Choudhry& Dullo<sup>21</sup> in India; in their studies on learning preference of medical students came out with the similar finding that majority of learners being multimodal and kinesthetic learning as the most preferred unimodal learning preference.

Such a pattern of learning mode preference is common not only in undergraduate medical students but also graduate and post graduate students. Brecker et al<sup>22</sup> in his study on undergraduate and graduate medical students found that 605 of students were multimodal and amongst the 40% of students preferring unimodal style kinesthetic mode was most common. A similar study was performed by Whillier et al<sup>23</sup> in Australian chiropractic program which included undergraduate, graduate and post graduate students, they found that 56% of students were multimodal and most of them had kinesthetic learning mode preference.

The most predominant learning mode in our study is same as that of the data on VARK website (45,856 general population) which 27.8% of kinesthetic mode as the maximum preference.<sup>24</sup> D'Amore<sup>25</sup> et al in their study among first year nursing students of Australia found kinesthetic style as the predominant learning mode preference.

There are some obvious reasons for the pattern of our findings in this learning mode preference study. The kinesthetic and aural learning habit in these students can be attributed to the fact that the main teaching learning methodology till their secondary school level are didactic lectures and practicals. Multimodal learning habit develops in these students as they have to prepare very hard for admission to medical college. During this preparation they use multiple modes of knowledge acquisition like attending lectures, reading textbooks, group discussions, meeting seniors, making their own pictorial notes etc.

Determination of the learning mode preference pattern of students will help us in upgrading the teaching and learning methodology in our college. Since the majority of our learners are multimodal so our teaching should preferably involve active learning strategies instead of traditional lectures. Any learning strategy that caters to all types of learners is an active learning strategy. These strategies include-models and demonstration<sup>26,27</sup> (visual learners), group discussion and debates<sup>28,29</sup> (aural learners), role playing<sup>30</sup> (kinesthetic learners).The use of multimedia in teaching can help to adopt active learning strategy as it can provide ways to stimulate the different sensory modalities through –tests, pictures, charts, audio video etc. The “meshing hypothesis “states that there can be significant increase in learning if the learning environment is according to the predominant learning style.<sup>32</sup> However some educationists are of the view that the teacher should involve a variety of teaching methods and teaching styles so that students are exposed to both preferred and less preferred modes and thus stimulating them to acquire and excel in other modes as well.<sup>31</sup>

The findings in our study prompt us not to ignore the kinesthetic and aural learning modality. Aural modality is very well taken care off in our set up by the traditional lectures. The practical's performed in different laboratories and clinical ward teachings promote kinesthetic learning. Further enhancement of kinesthetic learning can be through role playing and more patient- student interaction.

### Limitations

The study could have been more useful if we had made a gender wise correlation of learning mode preference. There would have been more significance of this study if we had performed it for all the students in the college (i.e. from first year to final year).

### Conclusion

The medical student has a task to acquire a huge amount of knowledge, skills and attitude. In order to facilitate the learning process of medical student this learning mode determination study was done. The result of this study demonstrated that majority of the students have multimodal learning preference. The most preferred mode of learning is kinesthetic followed aural. Therefore it is recommended that there should be involvement of active teaching and learning strategy which caters to all types of learners.

### Way Forward

This study can be further extended by correlating learning mode preference with other parameters such as, gender, academic performance, preferred teaching learning methodology and predominant instructional methodology used by the institute.

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