

Analysis of gender differences in learning style preferences among medical students

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Abstract

Background: Physiological brain processes determine the combination of personal learning style elements in every learner. The learning style of each student is unique. Identifying and employing appropriate learning styles could play an important role in selecting teaching styles and also to achieve the education goals ultimately. **Objective:** The purpose of this study was to assess the preferred learning styles among the undergraduate medical students and also to evaluate the gender differences in practicing various learning styles. **Materials and Methods:** This cross-sectional study was conducted among 150 second year medical students (72 males and 78 females). A validated VARK questionnaire was used to categorize the various learning styles of the students. The questionnaire consisted of 16 questions which identified the four learning styles: Visual, Aural, Reading- Writing and Kinesthetic and few open-ended questions as well. Descriptive statistics were used to identify the learning styles of students and data were analyzed by using SPSS software. Chi-square test was used to assess the association between learning preferences and sex. **Results:** The study showed that 28% of male students and 50% of female students preferred unimodal style of learning, 72% of males and 50% of females preferred bimodal style of learning. This clearly shows that male students are more diverse in choosing their preferred method of learning style when compared to the female students. **Conclusion:** Large proportion of male medical students preferred bimodal style of learning when compared to female students. It can be recommended that the learning preferences of medical students can be ascertained prior to the start of their academic tasks by using VARK questionnaire. As per the current study, students need to try different strategies to educate themselves. It is better for both lecturers and students to try various appropriate teaching-learning styles in order to promote their problem-solving skills and achieve greater educational goals.

Keywords: bimodal learning, learning style, unimodal learning, VARK questionnaire

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Introduction

The characteristics of individual learners vary in terms of age, culture, level of mentality preparedness, intelligence and psychological conditions, which lead to differences in learning styles. Students differ in their learning strategies which involve different sensory modalities.¹ The learners take in and process information in many different ways.² These are termed as learning habits. The learning habit of a learner is the way he handles new information and experiences and determines the outcomes. The academic performance of students will improve if they are allowed to learn in their preferred reading style.

According to Keefe the learning experience may vary among the students as per the individuals' nature and interests.³ Learning habit is "characteristic cognitive, affective and psychological behavior that serve as a relatively stable indicator of how learners perceive, interact and respond to the learning environment." It has been observed that different learners have their own learning habit.⁴ Visual, aural, reading and writing and kinesthetic (VARK) is one of the instruments which can be used to determine the learning styles.

Visual - Visual learning style is seeing words in books, whiteboard, smartboard and understanding information and instructions better through reading. Visual learners are able to retain information when it's presented to them in a graphic depiction, such as arrows, charts, diagrams, symbols and can be able to absorb the visual cues.

Auditory – Auditory/Aural learners learn subject matter that is presented to them vocally. These learners work well in group settings where vocal collaboration is present and may enjoy reading aloud to themselves, too. Linguistic clues are remembered, for example, suffixes, prefixes, and word order. They nod or ask frequent questions rather than taking written notes.

Reading/writing -These learners who learn best by taking notes during lectures or reading written or printed texts. These learners succeed with written information on worksheets, presentations, and other text-heavy resources.

Kinesthetic –They are "tactile" learners, prefer to physically act out events or use hands-on and thrive when engaging all of their senses during course work. These learners tend to work well in scientific studies and might need frequent breaks during heavy studying periods.

Although there are many learning styles, strategies and approaches based on different psychological constructs, there exist a greater deal of interest amongst the educators in identifying whether the learners are predominantly visual, auditory, reading/writing, and kinesthetic-oriented.⁵⁻⁷

During preclinical years, medical students experience different learning environments and acquire large amount of information. The teaching faculty need to understand the learning strategies of students in order to facilitate their learning. It has also been argued that medical teachers should not only possess the content knowledge but should also be acquainted with their learner's attributes.⁸

Many factors can influence student's learning styles. These factors are gender, age, academic achievement, brain processing, culture, and creative thinking.⁹ What is more important is that, students use different modalities of learning for assimilating knowledge and information.¹⁰ A study done by Slater et al showed that female medical students are diverse in choosing their preferred learning style.¹¹

For example, if a student is a "visual learner," a verbal lecture alone might give a feel of confusion-frustration and unengaged, so bimodal or multimodal style becomes mandatory which is the combination of one or more learning styles. In

reviewing the literature on the VARK, cross-sectional studies showed that students preferred multimodal style of learning.^{12,13}

The present study was undertaken to categorize the learning preferences between male and female second year medical students using the validated VARK questionnaire, latest English Version 7.0¹⁴

Materials and methods

This research was performed as a descriptive-cross sectional study. The target population was thesecond-year medical students (n=150) at a private medical college in Coimbatore, Tamil Nādu after getting clearance from theInstitutional ethics committee and informed consent from the students. Validated VARK questionnaire Version 7.0 was used in this study.

The questionnaire measures four perceptual preferences (V, A, R and K). It consists of 16 questions with four options each. The purpose of each question is to categorize the learning style preferences of the respondents. Respondents were instructed to choose one or two options of their preferred learning styles.

Students were explained about the need for the study, their rights in the study, confidentiality of the data and other ethical components of the study. The study participants were explained about the VARK questionnaire, different learning styles, and were requested to fill the questionnaire. Data were reported as percentages of students in each category of learning style preference.

The collected data was entered in Microsoft excel worksheet and processed by using the Statistical Package for the Social Sciences (SPSS) software, version 19. The descriptive data in the study was expressed using frequencies and percentages. Chi-

square test was used to assess the association between learning preferences and sex.

Results

A total of 150 students participated in this study. 48% of the participants were males and 52% were females. 28% of males preferredunimodal style of learning while 72% of males preferred bimodal style of learning. Females were equal in their preference. The results were statistically significant(CSV=7.75, P<0.005).

55% of males and 33% of females preferred aural mode of learning. Visual mode was more or less equally preferred between males and females(20% Vs 18%). 15% of males preferred read/write style compared to 28% ofmales. Kinesthetic mode of learning was preferred by 10% of males compared to 21% of females.

Though there are considerable differences in learning preferences between the maleand female students with respect to Aural, read/write and kinesthetic learning styles, the results were not statistically significant. (CSV=3.389,P=0.33).

Among those who chose two preferred methods for learning (bimodal learning style-aural and visual), 21% were males and 28% were females; 13% of males and 10% of females preferred AR (aural and read/write), 6% of males and 15.5% of females preferred RK (read/write and kinesthetic), 23% of males and 18% of females preferred AK (aural and kinesthetic), 31% of males and 15.5% of females preferred RV (read/write and visual), 6% of males and 13% of females preferred VK (visual and kinesthetic) methods as their preferred style of learning. The results were not statistically significant (CSV=6.454, P=0.59).

Table 1: Learning style preference between male and female students

Gender	Unimodal		Bimodal		CSV	P value
	Frequency	%	Frequency	%		
Male	20	28%	52	72%	7.748	0.005
Female	39	50%	39	50%		

Figure 1: Learning style preference between male and female students

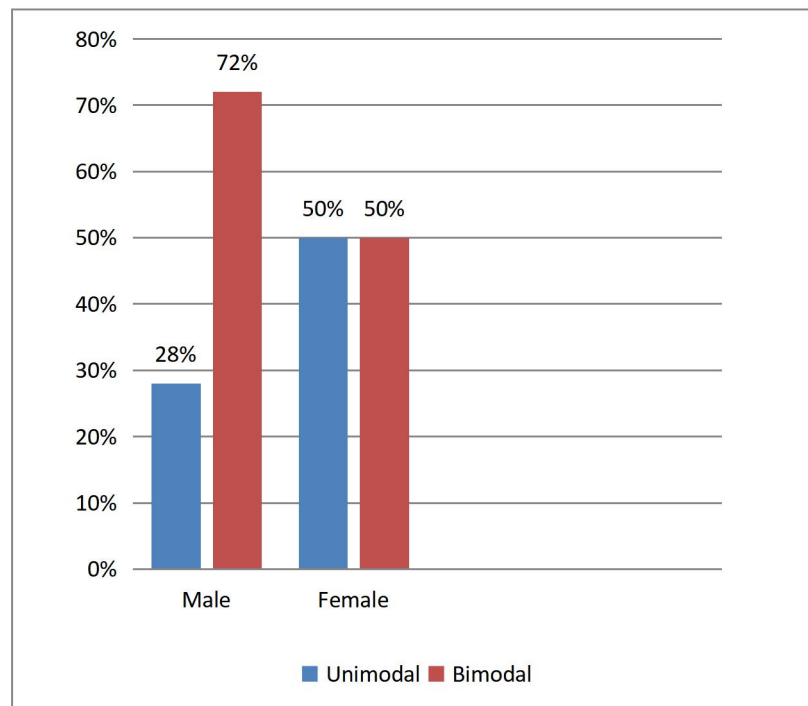


Table 2: Unimodal learning style between male and female students

	Aural		Visual		Read/write		Kinesthetic		CSV	P value
	Freq	%	Freq	%	Freq	%	Freq	%		
Male	11	55%	4	20%	3	15%	2	10%	3.389	0.33
Female	13	33%	7	18%	11	28%	8	21%		

Figure 2: Unimodal learning style between male and female students

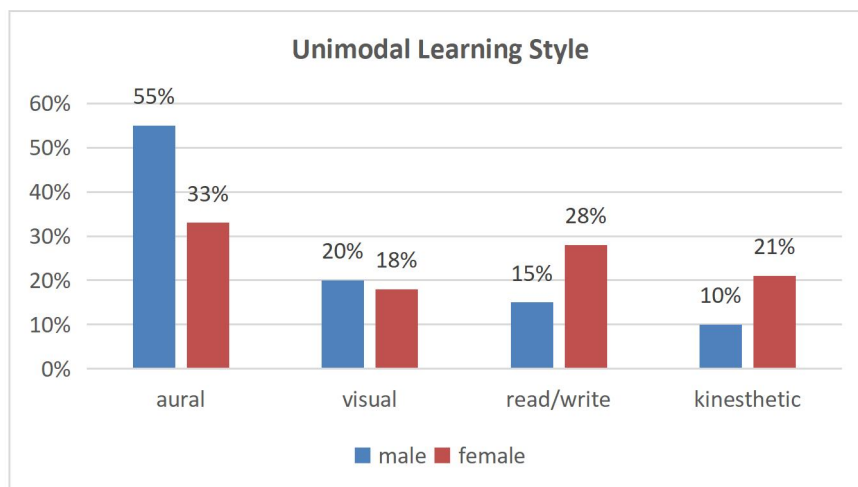
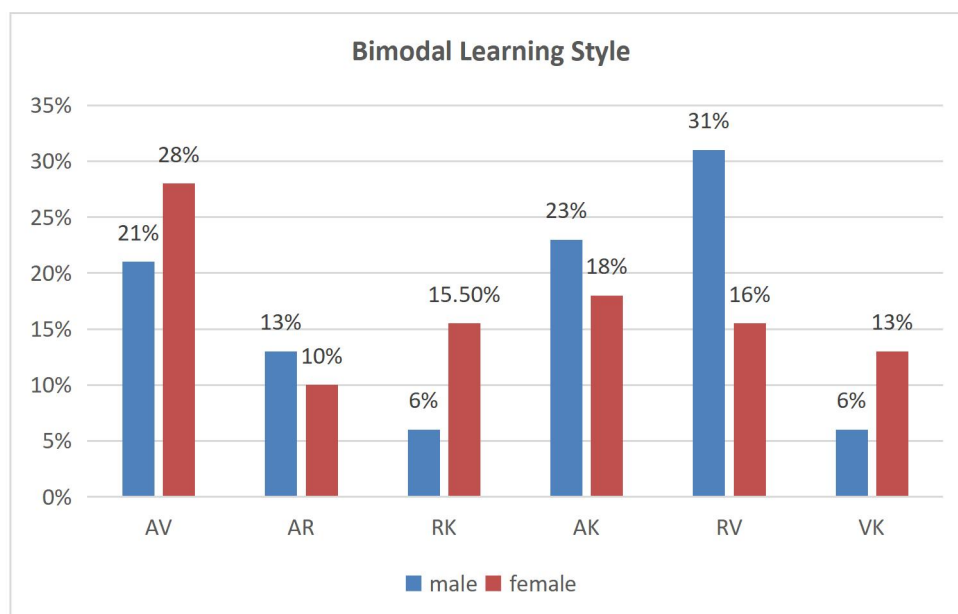


Table 3: Bimodal learning style between male and female students

	AV		AR		RK		AK		RV		VK		CSV	P value
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
Male	11	21	7	13	3	6	12	23	16	31	3	6	6.454	0.59
Female	11	28	4	10	6	15.5	7	18	6	15.5	5	13		

Figure 3: Bimodal learning style between male and female students



Discussion

Learning preferences become personal strengths that can be used to create a positive attitude towards learning. Brain dominance, Sensory modalities, timely physical needs, Attitude (self-directed/ motivated), environment and social aspects are the factors which determine learning styles. Student's approach of learning can be influenced by the perception that they gain from their learning environment. Medical profession usually requires several simultaneous skills involving sensory components such as Visual (i.e., deciphering graphic content in research articles), Auditory (i.e., listening to patients or clients), Read/write (i.e., reading journal articles and keeping records), and Kinesthetic (i.e., learning or performing physical examinations and procedures). In order to improve their academic performance, the knowledge of learning preferences may create awareness among the students and promote their learning to acquire lifelong professional skills. The faculty in medical college should talk with low achievers, focus on recommending and motivating the appropriate learning style (unimodal, bimodal or multimodal) to bring out the hidden potentials in them.

The current study showed that majority of the male students preferred bimodal style of learning, when compared to the female students. This is in contrary to a study conducted by Slater et al, where female students preferred more than one mode of learning compared to the male students.¹⁰ Our study showed less significant differences between male and female students in choosing their preferred style of learning (unimodal and bimodal).

Students who preferred bimodal learning style acquired new information from any of the two modes. These students do not learn by simply sitting in a classroom listening to the educator or memorizing the assignments.¹⁵ In order to achieve

meaningful learning, these students must understand the concepts, write about it, relate it to past experiences and knowledge, and apply it to their daily lives. It is important to emphasize that, the students will remember only 20% of what they read, 30% of what they hear, 40% of what they see, 50% of what they say, and 60% of what they do.¹⁶

As an educator it is important to know the preferred style of learning of each student to navigate the truth and myths around the learning styles. This helps the educator to identify and solve the learning related problems among the students, thus making them more effective learners.

To achieve this goal, it is of paramount importance to use active learning strategies like model and video demonstrations for visual learners. Auditory learners gain this during peer discussion, small group teaching sessions, collaborative testing, debates, games and answering questions. Manipulating models and role playing satisfies the need of kinesthetic and tactile learners. Active learning strategies promote thinking through reasoning and improve problem solving and decision-making skills.¹⁷

It may be difficult at times to tailor the course and work towards the individual learning styles of each student. Being aware of the learning style, the student may achieve the academic success and might be able to be a lifelong learner as per the new competency-based curriculum.

Conclusion

The study provides useful information for improving the quality of teaching-learning techniques in medical colleges. This study also showed the gender differences and sensory modality preferences in learning. Male students preferred bimodal style of learning compared to the female students. The preference of VARK model is same within each group between the male and female students. Preferred unimodal,

bimodal or multimodal styles must be followed to improve the knowledge, skills and attitude domains.

It can be recommended that the learning preferences of medical students should be verified prior to the start of the main academic tasks by using VARK questionnaire. It is better for both lecturers and students to combine different cognitive and psychomotor strategies and employ various appropriate teaching-learning styles to promote their problem-solving skills and achieve greater educational goals.

Limitations of the study

1. The sample size was small to check the association between males and females.
2. Multimodal learning styles can also be tested among the students.
3. The learning style preferred by the student may not be stable. They can change several times in the course of short possible time.

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Conflict of interest: Nil

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