



LEARNING METHOD PREFERENCES AMONG ADOLESCENT MEDICAL STUDENTS IN SOUTH INDIA

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ABSTRACT **BACKGROUND:** Adolescent medical students are freshly exposed to the medical subjects and the experience is entirely new and different compared to their earlier school learning. **OBJECTIVES:** To determine the preferences of learning methods among adolescent medical students and to determine which is the best method for learning different components. **MATERIAL AND METHODS:** It is a cross – sectional study conducted among the first year MBBS students in the class rooms of GSL Medical College, Rajahmundry for a period of three months using a standard pre – designed and pre – tested “VARK” questionnaire with learning methods as study variables. A class of 150 students was divided into 3 groups of 50 students each. They were initially taught about the different methods of learning by means of a lecture using power point presentation covering three sessions of 40 minutes each. Then, they were sensitized to the “VARK” questionnaire in the next session of 30 minutes and data was collected using the standard pre – designed and pre – tested “VARK” questionnaire. Time given to complete the questionnaire was 20 minutes. **RESULTS:** Among 134 adolescent medical students, 89 (66.13%) had completed 17 years age, 24 (17.91%) completed 18 years age, 14 (10.46%) completed 19 years age and 7 (5.2%) completed 20 years age. Mean age of students was 17.54±0.32 years. There were 77 (57.5%) females and 57 (42.5%) males. The students mostly preferred kinaesthetic style of learning. **CONCLUSION:** The present study emphasizes that different students have different learning styles and hence, using only one method of teaching may not benefit all the students.

KEYWORDS :**INTRODUCTION**

The learning styles are basically a preferred way of acquiring new information. It is the process by which a person understands and retains information, thereby gaining knowledge or skills.¹ Different people use different styles of learning to acquire knowledge, attitude or skills. Learning style is defined as “composite of characteristic cognitive, affective and physiological characters that serve as relatively stable indicators of how a learner perceives interacts with and responds to the learning environment”.² Keefe also notes that a better understanding of these styles by faculty can help reduce the student's level of frustration and improve instructional delivery methods.² The shift in medical curriculum from traditional to competency based medical education (CBME) emphasizes learner centered approach to teaching in order to make it more effective. Adolescent medical students are freshly exposed to the medical subjects and the experience is entirely new and different compared to their earlier school learning. Every adolescent has a unique style of learning and preference should be given to individual learning styles to make it learner centric, interesting and appealing to the students.

There are four major modalities of learning including Visual, Auditory, Reading/ writing, Kinesthetic (VARK).³ The concept of VARK was developed by Fleming and Mills to study the learning style preferences among students.⁴ The VARK questionnaire has been extensively used by many people across the world.⁵ Not only among other disciplines, this questionnaire has also been used in assessing learning style preferences among medical students across the world including India.^{3,6-14} Different students might prefer any of these modalities or any combination of these modalities. However, all the multimodal learners will have a predominance of one particular learning style either it be visual/auditory/read/kinesthetic.

The concept of learning styles has many implications for students and educators. Students can understand their learning modalities and develop individual study strategies and perform better in their studies.¹⁵ These also help the medical educators to adopt appropriate teaching – learning modalities as per learners' (students') preferences.

This study was conducted to know the learning style preferences among medical student under the categories of Visual, Auditory, Reading and Kinesthetic, so that we can devise teaching methods in

relation to students' preference of learning styles.

AIMS AND OBJECTIVES:

1. To determine the preferences of learning methods among adolescent medical students
2. To determine the method perceived as the best for learning different components

MATERIAL AND METHODS

A cross – sectional study was conducted among the first year MBBS students in the class rooms of GSL Medical College, Rajahmundry for a study period of three months (Oct 2019 to Dec 2019). Among a total of 150 students in the first year MBBS, data could be collected from 134 students. Inclusion criteria was all the students of first year MBBS, while excluded from the study were those who were absent on the day of data collection. A standard pre – designed and pre – tested “VARK” questionnaire was used to collect the data. For the purpose of sensitization and data collection, a class of 150 students was divided into 3 groups of 50 students each. They were initially taught about the different methods of learning by means of interactive lecture of one hour duration using power point presentation. After obtaining informed consent, they were sensitized to the “VARK” questionnaire in the next session of 30 minutes and data was collected using the standard pre – designed and pre – tested “VARK” questionnaire. VARK Questionnaire version 7.8¹⁶ which consists of 16 items which help to identify the preferred learning style of the student. VARK questionnaire consists of 16 questions which are situations we encounter in daily life with 4 options correlating with a particular learning style. Students were asked to encircle the answer which explained their learning style. They can choose multiple options if applicable or leave blank any question if not applicable. Time given to complete the questionnaire was 20 minutes. The study was approved by the Institutional Ethical Board of GSL Medical College, Rajahmundry, Andhra Pradesh.

Operational definitions: The operational definitions used in the questionnaire were based on VARK concept.¹⁷ The definitions of the four learning preferences are as follows:

1. "Visual" (V) includes / means: The depiction of information in maps, spider diagrams, charts, graphs, flow charts, labelled

- diagrams, and all the symbolic arrows, circles, hierarchies and other devices, that people use to represent what could have been presented in words.
- "Auditory" (A) includes / means: A preference for information that is "heard or spoken." Learners who have this as their main preference report that they learn best from lectures, group discussion, radio, email, using mobile phones, speaking, web-chat and talking things through. They have need to say it themselves and they learn through saying it - their way.
 - " Read / Write (R) includes / means: This preference is for information displayed as words. This preference emphasizes text based input and output - reading and writing in all its forms but especially manuals, reports, essays and assignments.
 - "Kinaesthetic" (K) includes / means: Perceptual preference related to the use of experience and practice (simulated or real). It includes demonstrations, simulations, videos and movies of "real" things, as well as case studies, practice and applications.¹⁷

STATISTICAL ANALYSIS:

Data extraction and analysis was done using Microsoft Excel 2007 and SPSS version 20. Results were expressed as percentages for categorical variables. Continuous variables were expressed as mean and standard deviation. Chi - square test was used to analyze the categorical variables and Paired 't' test was applied to compare the mean scores. Independent 't' test and ANOVA test were used to compare means between groups. A 'P' value of <0.05 is considered as statistically significant.

RESULTS

Data could be collected from a total of 134 adolescent medical students. Among 134 adolescent medical students, 89 (66.13%) had completed 17 years age, 24 (17.91%) completed 18 years age, 14 (10.46%) completed 19 years age and 7 (5.2%) completed 20 years age. Mean age of students was 17.54±0.32 years. There were 77 (57.5%) females and 57 (42.5%) males. It was found that there is a significantly increased preference for learning by kinaesthetic methods compared to other methods

Method	Mean	Standard deviation	"F" value (ANOVA)	P value
V	4.57	2.623	58.38	0.000
A	5.97	2.804		
R	3.61	2.343		
K	7.57	2.660		

In the present study, the mean VARK scores among male and female students did not show statistically significant difference and this was consistent with the findings of Thomas et. al.²⁰ who also observed no significant difference between mean scores of male and female students.

Learning style	Males		Females		Analysis	
	Mean	S.D	Mean	S.D	"t" test	P value
V	4.25	2.206	4.81	2.884	1.224	0.223
A	5.93	2.796	6.00	2.828	0.142	0.887
R	3.21	2.033	3.91	2.519	1.723	0.087
K	7.67	2.538	7.51	2.761	0.343	0.732

The overall percentage of unimodal learners was 76.34%. Unimodal learning was more prevalent (76.34%) while the overall representation of multimodal learners was 23.66%, of these bimodal were 83.51%, trimodal 9.34% and quadrimodal 7.15%. Among the unimodal learning styles, visual was 23.71%, auditory 18.42%, reading/writing 12.33% and kinaesthetic 45.54%. It is also observed that both males and females had less mean score for read modality when compared to visual/auditory/kinesthetic and similar observations were reported by Thomas et.al.²⁰

DISCUSSION

Learning preferences of adolescent medical students have varied over the years and demand suitable changes in the teaching methods in order to imbibe the subject with better understanding and reproducibility. This study was conducted to find the learning inclinations of medical students in our college to help formulation of teaching learning styles for the students.

The findings of this study provides information about the ways in which medical students prefer to learn and help the faculties to formulate novel and suitable teaching learning methods to facilitate students learn according to their learning styles.

Among 134 adolescent medical students in the present study, 89 (66.13%) had completed 17 years age, 24 (17.91%) completed 18 years age, 14 (10.46%) completed 19 years age and 7 (5.2%) completed 20 years age. Mean age of students was 17.54±0.32 years, while in a study by Karthika et. al.¹⁸ mean age of the study population (N=132) was 20.6 years (S.D- 1.1) and of the 132 students, 37.9% were males and 62.1% were females similar to the present study with more number of females (57.5%) compared to males (42.5%).

In the present study, it was found that there is a significantly increased preference for learning by kinaesthetic methods compared to other methods, unlike the finding in a study by Karthika et. al.¹⁸ wherein majority (44.6%) preferred auditory style out of the four unimodal styles and the mean VARK score of auditory style was higher when compared to other styles. However, Iyshwarya et. al.¹⁹ also showed that kinaesthetic method was the most preferred style for learning, consistent with the present study.

There was no significant difference observed in the mean VARK scores among male and female students in the present study unlike a significant difference found in mean VARK scores between males and females in a study by Iyshwarya et. al.¹⁹ Consistent with the present study, there was no statistically significant difference found between the individual scores between male and female respondents in a study by Thomas et. al.²⁰ The present study reported that both males and females had less mean score for "read" modality when compared to visual/auditory/kinesthetic and similar observations were reported by Thomas et.al.²⁰

The present study also showed that the overall percentage prevalence of unimodal learners was 76.34% while the overall representation of multimodal learners was 23.66% and among these, bimodal were 83.51%, trimodal 9.34% and quadrimodal 7.15%. Among the unimodal learning styles, visual was 23.71%, auditory 18.42%, reading/writing 12.33% and kinaesthetic 45.54%. In a study by Karthika et. al.¹⁸ the prevalence of unimodal learners were 56.1% which is lower than the present study, multimodal learners were higher (40.9%) compared to present study and bimodal learners, 3% while there were no trimodal learners. But a study by Thomas et. al.²⁰ using VARK questionnaire among first year medical students revealed that none of the respondents preferred unimodal method. 3.125% were bimodal, 31.875% were trimodal and 63.125% were quadrimodal. A study from South India by Shenoy et al.²¹ showed similar findings in which 70% of the respondents preferred multimodal way of learning and they opted for kinesthetic. Asima Banu et. al.²² in their study among medical students in South India revealed that the overall percentage of unimodal learners was 87.33%. The overall representation of multimodal learners was 12.67% among which, bimodal were 89.5%, trimodal 5.26% and quadrimodal 5.26%. Among the unimodal learners, the percentage distribution of single visual was 29.01%, single auditory 21.37%, single read/write 33.6%, and single kinaesthetic 16.03%.

Mean score for Kinaesthetic was highest (7.57) followed by Aural (5.97), Visual (4.57) and Reading (3.61) methods in the present study, while in a study by Karthika et. al.¹⁸ mean score was highest for auditory style (6.5) followed by kinaesthetic (5.88), reading/writing (4.25) and visual style (4.13). Similar to the present study, a study among Saudi Arabian students showed higher mean VARK scores for aural (6.6) and kinesthetic learners (6.4) compared to lower mean scores for visual (5.3) and reading/writing learners (4.7). The reason may be because of heavy involvement of the Saudi Arabian students in new technology.²³ Thus different studies reiterate that different students have different learning preferences and styles and our teaching learning methods should be tailored to their learning styles to provide maximum benefit of the teaching learning process.

CONCLUSION AND RECOMMENDATIONS

The present study helps to find out various ways for every learner to be successful in his or her life. It facilitates teaching learning process in a better way. Even assessing different types of learning styles provide the basis to give advice regarding student's motivation, classroom management, evaluation, curriculum development and assessment of students learning. It also helps counsellor to develop various strategies as well as techniques that are responsive to unique learning needs. Knowledge of learning styles is essential in improving instructional skills, curriculum development and assessment of student learning. This is applicable to all areas of education i.e. curriculum, instruction, leadership and counselling.

The present study emphasizes that different students have different

learning styles though they belong to same institution. However, traditionally, used lecture format alone may not benefit all the students. The students mostly preferred kinaesthetic style of learning. It therefore becomes important for the medical faculty to have knowledge about their student learning styles and encourage them to recognize their learning style, thus facilitating their learning.

More multi-centric studies may be conducted to provide additional evidence so that it helps teachers, students as well as policy makers to plan effective teaching learning methods that can ultimately benefit the students

LIMITATIONS OF THE STUDY

1. The present study included only first semester students and hence study results cannot be generalized.
2. Small sample size
3. Other factors influencing the learning such as academic performance could not be explored in the present study.
4. VARK style does not analyze all the aspects of learning.

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REFERENCES

1. Adesunloye, B.A. Aladesanmi. O., Henriques-Forsythe, M. & Ivonye, C. (2008) The Preferred Learning Style among Residents and Faculty Members of an internal Medicine Residency Program, *Journal of the National Medical Association*, 100, pp.172-175.
2. Keefe, James W. (1987). Learning Style Theory and Practice. <https://eric.ed.gov/?id=ED286873> (Accessed on 28/08/2020)
3. Heidi LL, Stephen ED. First-year medical students prefer multiple learning styles. *Advan in Physiol Edu* 2006; 30:13-16.
4. Fleming ND, Mills C. Not another Inventory, Rather a Catalyst for reflection. *To Improve the Academy* 1992; 11:137-55.
5. www.vark-learn.com [internet]. VARK: Guide to Learning Styles. Available at: <http://www.vark-learn.com/introduction-to-vark/the-vark-modalities/> (Cited on 3rd March 2014).
6. David WR, Heidi LL, Stephen ED. Lecture learning by doing: construction and manipulation of a skeletal muscle model. *Journal of Dental Education* 2013; 77:1371-1378.
7. Loulwa MSR. Saudi Arabia: Influence of Gender and GPA Learning Style Preferences of First-Year Dental Students at King Saud University. *Advan in Physiol Edu* 2014; 38:216-220.
8. Ding Y, Liu J, Ruan H, Zhang X. Learning Preferences to Physiology of Undergraduate Students in a Chinese Medical School. *IJEME* 2012; 2:1-5.
9. Choudhary R, Dullo P, Tandon RV. Gender differences in learning style preferences of first year Medical students. *Pak J Physiol* 2011; 7:42-45.
10. Baykan Z, Nacar M. Learning styles of first year medical students attending Erciyes University in Kayseri, Turkey. *AdvPhysiolEduc* 2007; 31:158-60.
11. Laxminarayana A, Udupa RP, Urval, Kamath A, Ullal S, Shenoy AK, et al. Assessment of learning styles of undergraduate medical students using the VARK questionnaire and the influence of sex and academic performance. *Australas Psychiatry* 2014; 38:216-220.
12. Kharb P, Samanta PP, Jindal M, Singh V. The Learning Styles and the Preferred Teaching-Learning Strategies of First Year Medical Students. *J ClinDiagn Res* 2013; 7:1089-1092.
13. Anu S, Anuradha, Meena T. Assessment of Learning Style Preference among Undergraduate Medical Students - Using VAK Assessment Tool. *International Journal of Medical and Clinical Research* 2012; 3:229-31.
14. Manjeet S, Renu G, Binod KB, Himanshu M, Jeewandeeep K, Manpreet K. Learning style preferences of first year MBBS girl students. *Transworld Medical Journal* 2014; 2:18-23
15. Bostrom, L. (2011) Students' Learning Styles Compared with their Teachers' Learning Styles in Secondary Schools, *Institute for Learning Styles Research Journal*, 1, pp. 17-38.
16. Fleming ND, Teaching and learning styles VARK strategies, Newzealand, 2001, 128p
17. www.vark-learn.com [internet]. VARK: A Guide to Learning Styles. The English version of the questionnaire is available at: <http://www.vark-learn.com/english/page.asp?p=questionnaire> (Accessed on 4th Sept 2019).
18. Karthika M, Prathibha MT, Sairu Philip. Learning style preferences of medical students in a government medical college in central Kerala. *International Journal of Contemporary Medical Research* 2017; 4(10):2187-2189.
19. Iyshwarya et. al., Learning styles and its effect on academic performances of first year MBBS students. *Journal of Research in Medical Education and Ethics*. Vol 8 (1): March 2018 pp 23 – 29.
20. Thomas et al. How do medical students learn? a study from two medical colleges in south India - A cross sectional study. *Int J Med Res Health Sci*. 2015; 4(3):502-505
21. Shenoy N, Shenoy A, Ratnakar UP. The Perceptual Preferences in Learning among Dental Students in Clinical Subjects, *Journal of Clinical and Diagnostic Research*. 2013; 7(8): 1683-85.
22. Banu A, Gopal KHB., Janani R. Learning Style Preferences Among Medical and Nursing Students in a Medical College in South India. *J Educational Res & Med Teach* 2014; 2(1):21-4.
23. Ayesha Nuzhat, Raneem O. Salem, Mohammed S.A. Quadri, Nasir Al-Hamdan. Learning style preferences of medical students: a single-institute experience from Saudi Arabia. *Int J Med Edu* 2011; 2:70-3