

Medical Education / Original Article

Motivating but Not Labelling the Students: A Qualitative Study on the Preferences of Learning Styles Among Undergraduate Medical Students

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Abstract

Introduction: Every individual has his/her learning style preferences. A student should not be labelled as a particular type of learner rather he/she may be empowered with the different learning style preferences. Visual-aural-read/write-kinaesthetic (VARK) is a sixteen-item questionnaire which defines the preference of learning based on sensory modalities.

Aims: The aim of this study was to assess preferences in learning style among undergraduate medical students and to compare their relation to gender.

Methods and Material: This was a descriptive cross-sectional questionnaire based study. Institute Ethics Committee approval and informed consent were obtained prior to start of this study. Preferred modes of learning of 300 undergraduate medical students were assessed by means of self-administered VARK questionnaire. A p value < 0.05 was considered statistically significant.

Results: Among 300 students, 172 (57%) were females and 128 (43%) were males. Nearly 228 (76%) had unimodal learning style and 72 (23.9%) preferred multimodal learning. Among unimodal learners, a majority (37%) were of auditory learners followed by kinaesthetic (25.3%). There was a significant difference ($p < 0.008$) between the learning style preferences among males and females.

Conclusions: A majority of students had unimodal learning style. Male and female students differed significantly in their learning style preferences. Understanding different concepts of learning preferences and incorporation of appropriate unimodal and multimodal teaching methods will be beneficial in helping teachers in facilitating student's learning. This paves way for improving quality of teaching and learning attitudes among medical professionals. Thus, a student should not be labelled as a particular type of learner rather he/she may be empowered with the different learning style preferences.

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Introduction

The art of learning differs from individual to individual. Each and every individual has his/her learning style preferences. Interestingly the different learning styles are neither superior nor inferior to one another, but they differ from each other with their own advantages and disadvantages (1). Thus, these styles makes the learning process in an easier way and thereby the processed information can be retained in the memory for a longer period. The majority of the preferences in learning varies with the type of information to be processed and the situation in which it really occurs. There are different theories and models pertaining to learning styles (2). These can be classified in general into personality, information processing, social interaction and instructional preferences models. 'Personality model' classifies a person as an introvert or an extrovert in relation to the manner of student's reaction to the information being processed. The 'information processing model' concentrates on the processing of acquired information to be stored for a longer period. 'Social interaction model' focuses on the behaviour and the interaction of a student in a classroom. Instructional preferences model categorises a person on the basis of sensory modality of perceptions (3). Visual, aural, reading/writing and kinaesthetic (VARK) is one of the instruments which can be classified under instructional preferences model of learning. The VARK questionnaire was developed based on three principles. Everyone can learn through their own style of preference. Different preferences in learning style make them get motivated and empowered. By this way, students learn the education process by experience, projection, contemplation, and accomplishment (4, 5). Even though we practise the multimodal way of teaching in institutes nowadays, we still were not able to find whether they adequately address the different type of learners among the male and female students. Further a student should not be labelled as a particular type of learner rather he/she may be empowered with the different learning style preferences. Moreover studies have shown controversial results on the gender differences in learning style preferences also (1, 6–8). Hence, we assessed the preferences in learning styles among undergraduate medical

students and compared their relation to gender.

Materials and Methods

This was a descriptive cross-sectional questionnaire-based study conducted during regular working hours in the college premises between February and April 2016. Institute Ethics Committee approval and informed consent were obtained verbally before initiation of the study. Preferred modes of learning of 300 prefinal and final year undergraduate medical students were assessed using self-administered VARK questionnaire (© Copyright Version 7.8 (2014) held by VARK Learn Limited, Christchurch, New Zealand with prior permission obtained from the developer). Convenient sampling method was used. Specific instructions for answering the questionnaire were provided to all the medical students and were asked to return the completed questionnaire to the investigator. The questionnaire consisted of sixteen multiple choice questions with four responses, and the students were asked to select either single or multiple responses. VARK questionnaire assesses the students' preferred mode of learning by giving a scenario (real life situations) with four responses and each response will represent one of the learning styles (V/A/R/K) or a particular preferred sensory modality. The sensory modality with the highest score will be the overall preference of that particular student. All the students participated voluntarily and were free to clarify their questions regarding filling up of questionnaire. They were asked to mention their gender and steps were taken to ensure that no name or initials be recorded. The obtained data were entered in the Microsoft Excel spread sheet. Variables or individual VARK components were expressed as mean±standard deviation and frequencies in percentages of students. The statistical analysis was performed using SPSS for Windows version 16.0 software (SPSS, Chicago, USA). Chi-square and independent samples t-test was used wherever it is appropriate. A p-value < 0.05 was considered statistically significant.

Results

At the end of the study period, a total of 300 medical

students participated in the study and completed the questionnaire. Among the 300 students, 172 were females (57%) and 128 were males (43%). Nearly 228 (76%) students had unimodal learning style and remaining 72 (23.9%) preferred multimodal learning. Thus, majority of students preferred a single sensory modality of learning. Among the unimodal learners, a majority, nearly 111 students (37%) preferred Aural (A) type or were auditory learners followed by 25.3% kinaesthetic learners (n=76). The multimodal learners include 20.3% bimodal (n=61), 3.3% trimodal (n=10) and 0.3% quadrimodal (n=1) (Fig. 1). In the bimodal learners, most of them preferred AK, a combination of auditory and kinaesthetic styles (10%) followed by VA contributing to 3.3%. However, in the trimodal learners, VAK and ARK styles contributed equally (1.3%) when compared to VAR (0.7%). The quadrimodal learners (VARK) were around 0.3% (Fig. 2). The mean scores for individual VARK components were also assessed. The auditory learners had a higher mean score of around 7.01 ± 2.658 followed by kinaesthetic learners 6.26 ± 2.447 . The visual learners had a score of 4.88 ± 2.648 and the Read/Write learners had the lowest mean score of 4.22 ± 2.451 .

Fig. 3 shows the pattern of gender differences among the different modes of learners. There was a significant difference ($p < 0.008$) between the learning style preferences of males and females (Fig. 4). The female students had a higher preference for unimodal and quadrimodal learning while the male students preferred bimodal and trimodal learning. Table I

TABLE I: Mean scores of individual VARK components based on sex.

VARK Component	Mean score	P value
Visual		
Men	4.43±2.616	0.011
Women	5.21±2.630	
Auditory		
Men	6.88±2.718	0.438
Women	7.12±2.615	
Read/Write		
Men	4.05±2.364	0.283
Women	4.35±2.512	
Kinaesthetic		
Men	5.66±2.138	0.000
Women	6.71±2.570	

Values are expressed as Mean±SD. Mean scores compared using Independent samples t-test. p value <0.05 considered statistically significant.

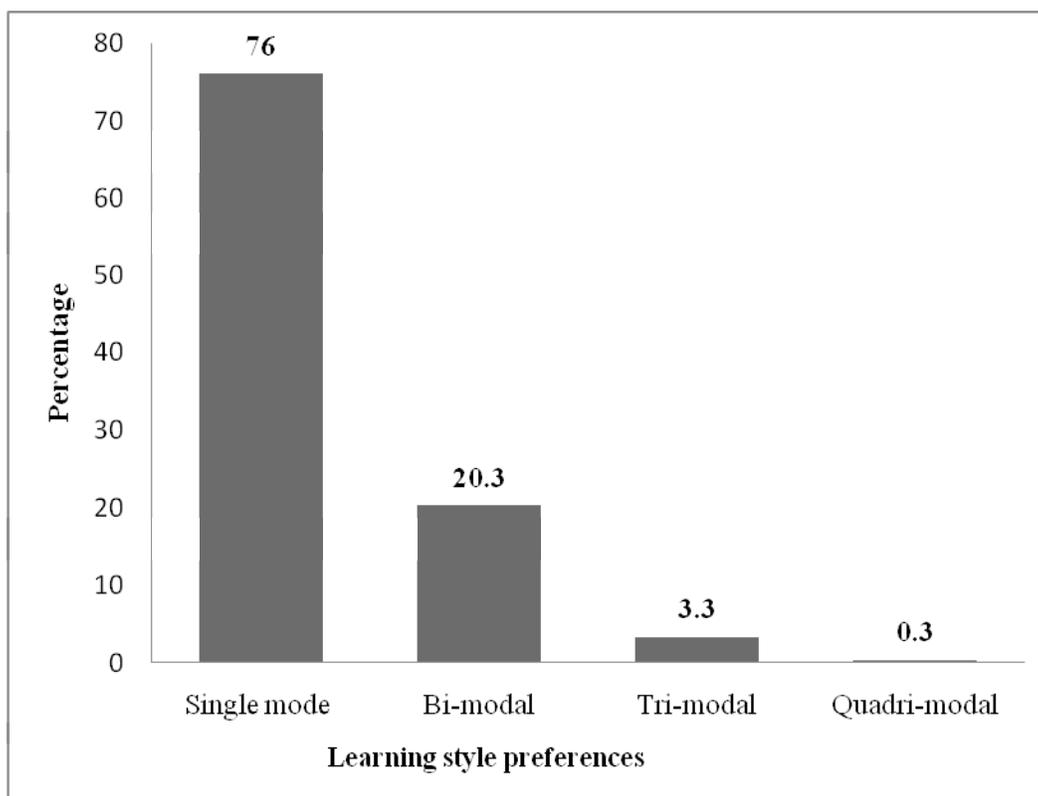


Fig. 1: Distribution of single and multiple learning preferences among medical students (n=300).

depicts the mean scores of different learning style preferences based on sex among the individual VARK components. It was found that there was a significant

difference between the males and females among the visual ($P < 0.011$) and kinaesthetic learners when compared to the other modalities of learning.

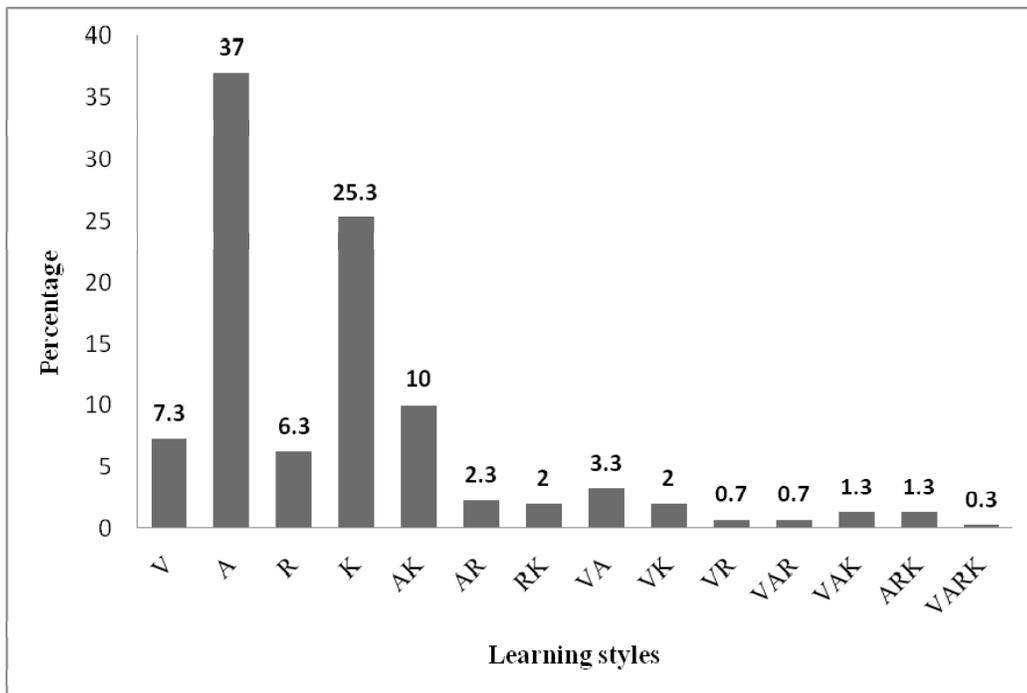


Fig. 2: Pattern of different learning style preferences among medical students (n=300).

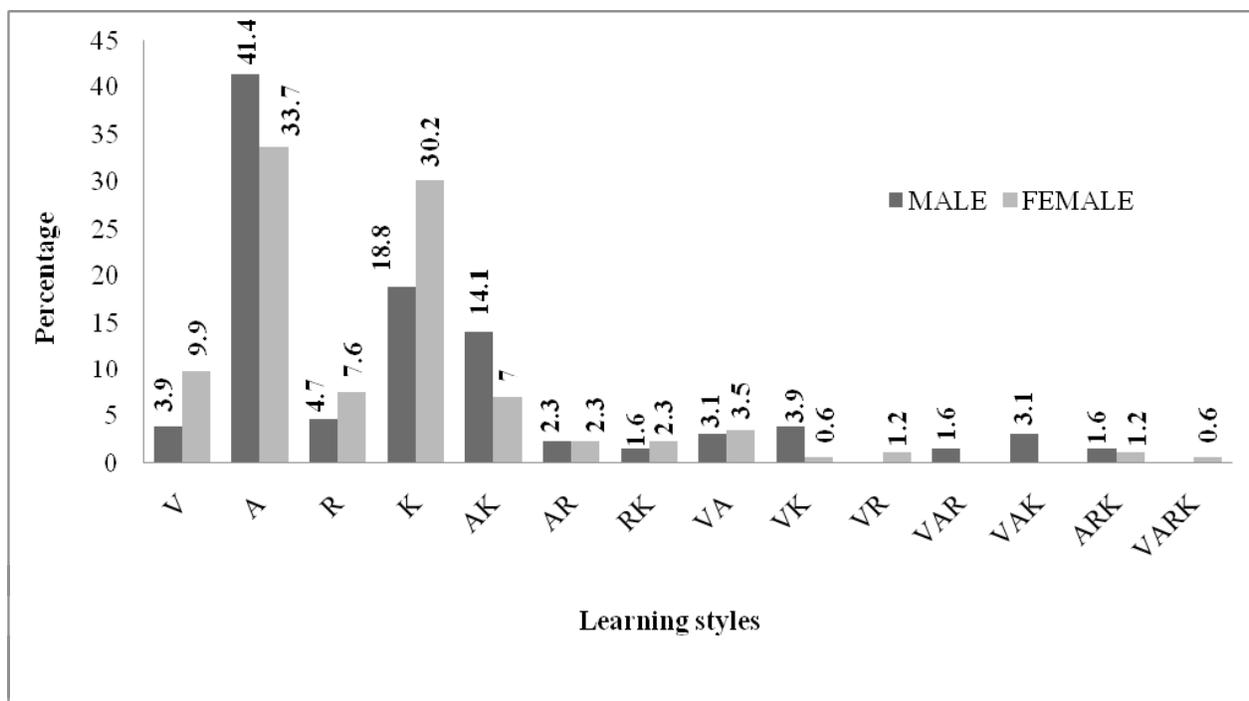


Fig. 3: Pattern of gender differences among individual VARK components (M=128; F=172).

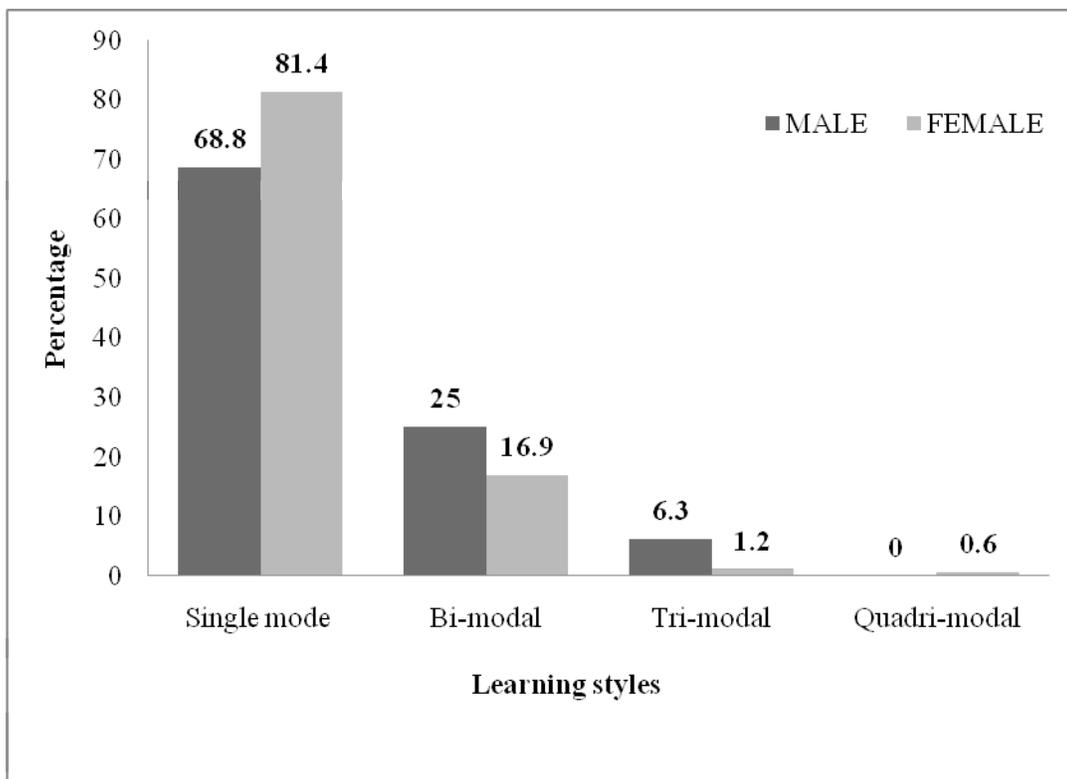


Fig. 4: Gender differences among learning style preferences (M=128; F=172).

Discussion

Learning should be an active process. All students should acquire deep understanding of the subject through the process of preferential learning (9). Bhagat *et al.* (2015) have stated that the awareness of learning styles, among students, motivated them to adapt to other learning strategies (10). Thus incorporating appropriate learning style model is essential for better and in-depth understanding of the subjects. There are several inventories which can be used for assessing learning style preferences. This study was undertaken with the intention to assess the preferences in learning style among the prefinal and final year undergraduate medical students using the VARK questionnaire which falls under the instructional preferences model. In the present study nearly 76% of students were unimodal learners (Aural-37%, Kinaesthetic-25.3, Read/write-6.3%, visual-7.3%) and remaining 23.9% were multimodal learners. These findings were almost similar to the study done by Marwaha *et al.* (2015) in North India. In their study 51% students preferred unimodal

learning style with Kinesthetic (27%), Aural (15%), read/write (6%) and visual mode (3%) followed by 49% students preferring multiple modes (bi-modal (23%), tri-modal (17%), quad-modal preference (9%). V score of females was significantly higher when compared to males ($p=0.004$) (11). However, in contrary to the present study, in majority of the studies done in different parts of the world, multimodal learning style (quadri-modal being the major) was the dominant learning style of students (6–8,12–23). The reason behind these may be due to the fact that the learning style preferences may vary among individuals based on the socio-economic status, culture, the level of preschool education etc (3). Hence both unimodal, as well as multimodality of teaching, should be offered to the students as the learning preferences may vary depending on the situational need. There should be a blend of activities to the students which may stimulate all the four sensory modalities apart from the regular didactic lectures. Thus, visual learners may be benefitted from using demonstrations, models, charts and simulations. The auditory learners may be satisfied with discussions during role play, seminars, debates

etc. The read/write and kinaesthetic learners may assimilate information through printed words and practical applications. Our study also depicted that majority of the students were auditory learners followed by kinaesthetics. These results were almost similar to that shown by the other studies (1, 6, 21). Thus, the current strategy of teaching should incorporate the use of multimedia technology approaches which can provide opportunities for auditory and kinaesthetic learners.

It has been found that gender differences also play a significant role in learning process. A study done by cheong *et al.* in 2004 has shown that male students have a preference for logical and rational evaluation, and the female students have preferences over elaborative processing (tend to look for personal connections and relevance with learning material). Moreover, male students are more achievement oriented whereas the female students are social and performance oriented (24). Thus in the present study, the female students had a higher preference for unimodal and quadrimodal learning while the male students preferred bimodal and trimodal learning. There was also a significant difference in gender among the visual ($P < 0.011$) and kinaesthetic learners when compared to the other modalities of learning which is almost similar to the other studies (1, 6, 19, 25). But in contrary to this scenario some studies have shown that learning styles did not differ much between the male and the female students (7, 8, 23, 26).

In the past, in our institution, the theoretical lectures in pharmacology were delivered through chalk & board teaching and by using PowerPoint lectures. Practical classes were delivered through demonstrations through charts and discussions through PowerPoint presentations. Based on the findings of our study, since the modalities of learning differ from student to student, the modalities of teaching should also be changed depending on the need. Thus, at present, in our institution, brainstorming sessions, computer simulations, small and large group discussions, role plays, debates were introduced and an appropriate feedback from the learners was obtained. In this way, the lectures and practicals in pharmacology may be

best assimilated in a better way by all the four sensory modalities of learners. Thus the selection of appropriate T-L methods with a better understanding of learning style preferences may help us to refine the teaching curriculum in Pharmacology for a better academic performance.

Our study attempted to explore the possibility of describing the learning style preferences of undergraduate medical students in our institute. However, we did not compare the learning style preferences with academic achievements of the students which may be considered as one of the limitations of our study. The other limitation was that we did not compare the questionnaire based learning style preferences with the self-perceived learning style preferences of every individual student. Further, the comparison between the preferences in the learning style between the prefinal and the final year students was not made. We also did not consider the confounding factors such as the age, socioeconomic status, culture, etc. which may have a substantial effect on the study. Thus, based on the preferences in learning styles, a student should not be labelled as a particular type of learner rather he/she may be empowered with the different learning style preferences.

Conclusion

In the present study majority of students are unimodal learners. Male and female students differed from each other significantly in their learning style preferences. Hence, incorporation of appropriate unimodal and multimodal teaching-learning methods plays an essential role in strengthening the quality of medical education depending on the needs of the students. Further, a better understanding of different concepts of learning preferences will be beneficial in helping teachers in facilitating student's learning. Thus, the knowledge of learning style preferences should act as a catalyst for student learning rather than labelling them as a particular type of learner. This understanding paves way for improving the quality of teaching and learning attitudes among medical professionals.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

References

- Wehrwein EA, Lujan HL, DiCarlo SE. Gender differences in learning style preferences among undergraduate physiology students. *Adv Physiol Educ* 2007; 31(2): 153–157.
- Coffield F, Learning and Skills Research Centre. Learning styles and pedagogy in post-16 learning. London: Learning and Skills Research Centre; 2004.
- Khanal L, Shah S, Koirala S. Exploration of preferred learning styles in medical education using VARK modal. *Russ Open Med J* 2014; 3(3): 305.
- Applying What We Know - Student Learning Styles [Internet]. [cited 2016 Sep 30]; Available from: <http://www.adesignmedia.com/onlineresearch/Applying%20What%20We%20Know%20-%20Student%20Learning%20Styles.htm>
- Boyle EA, Duffy T, Dunleavy K. Learning styles and academic outcome: the validity and utility of Vermunt's Inventory of Learning Styles in a British higher education setting. *Br J Educ Psychol* 2003; 73(Pt 2): 267–290.
- Nuzhat A, Salem RO, Quadri MSA, Al-Hamdan N. Learning style preferences of medical students: a single-institute experience from Saudi Arabia. *Int J Med Educ* 2011; 2: 70–73.
- Prithishkumar IJ, Michael SA. Understanding your student: using the VARK model. *J Postgrad Med* 2014; 60(2): 183–186.
- Al-Saud LMS. Learning style preferences of first-year dental students at King Saud University in Riyadh, Saudi Arabia: Influence of gender and GPA. *J Dent Educ* 2013; 77(10): 1371–1378.
- Lujan HL. Too much teaching, not enough learning: what is the solution? *AJP Adv Physiol Educ* 2006; 30(1): 17–22.
- Bhagat A, Vyas R, Singh T. Students awareness of learning styles and their perceptions to a mixed method approach for learning. *Int J Appl Basic Med Res* 2015; 5(Suppl 1): S58-S65.
- Marwaha K, Bhagat A, Kapoor N. Learning Style Preferences of Undergraduate Dental Students of a North Indian Dental College. *Indian J Physiol Pharmacol* 2015; 59(2): 231–237.
- Lujan HL, DiCarlo SE. First-year medical students prefer multiple learning styles. *Adv Physiol Educ* 2006; 30(1): 13–16.
- Baykan Z, Naçar M. Learning styles of first-year medical students attending Erciyes University in Kayseri, Turkey. *Adv Physiol Educ* 2007; 31(2): 158–160.
- Urval RP, Kamath A, Ullal S, Shenoy AK, Shenoy N, Udupa LA. Assessment of learning styles of undergraduate medical students using the VARK questionnaire and the influence of sex and academic performance. *AJP Adv Physiol Educ* 2014; 38(3): 216–220.
- Sarabi-Asiabar A, Jafari M, Sadeghifar J, Tofighi S, Zaboli R, Peyman H, et al. The Relationship Between Learning Style Preferences and Gender, Educational Major and Status in First Year Medical Students: A Survey Study From Iran. *Iran Red Crescent Med J* [Internet] 2014 [cited 2016 Sep 29];17(1). Available from: http://www.ircmj.com/?page=article&article_id=18250
- Panambur S, Nambiar V, Heming T. Learning Style Preferences of Preclinical Medical Students in Oman. *Oman Med J* 2014; 29(6): 461–463.
- Peyman H, Sadeghifar J, Khajavikhan J, Yasemi M, Rasool M, Yaghoubi YM, et al. Using VARK Approach for Assessing Preferred Learning Styles of First Year Medical Sciences Students: A Survey from Iran. *J Clin Diagn Res JCDR* 2014; 8(8): GC01-GC04.
- Whillier S, Lystad RP, Abi-Arrage D, McPhie C, Johnston S, Williams C, et al. The learning style preferences of chiropractic students: A cross-sectional study. *J Chiropr Educ* 2014; 28(1): 21–27.
- Kharb P. The Learning Styles and the Preferred Teaching–Learning Strategies of First Year Medical Students. *J Clin Diagn Res* [Internet] 2013 [cited 2016 Sep 29]; Available from: http://www.jcdr.net/article_fulltext.asp?issn=0973-709x&year=2013&month=June&volume=7&issue=6&page=1089-1092&id=3090
- R Abdallah A, Al-zalabani A, Alqabshawi R. Preferred learning styles among prospective research methodology course students at Taibah University, Saudi Arabia. *J Egypt Public Health Assoc* 2013; 88(1): 3–7.
- Samarakoon L, Fernando T, Rodrigo C, Rajapakse S. Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC Med Educ* 2013; 13(1): 1.
- Alkhasawneh E. Using VARK to assess changes in learning preferences of nursing students at a public university in Jordan: implications for teaching. *Nurse Educ Today* 2013; 33(12): 1546–1549.
- Dobson JL. A comparison between learning style preferences and sex, status, and course performance. *Adv Physiol Educ* 2010; 34(4): 197–204.
- CDTL Brief, Newsletter [Internet]. [cited 2016 Sep 30]; Available from: <http://www.cdctl.nus.edu.sg/brief/v7n1/default.htm>
- Shenoy N, Shenoy K A, U P R. The perceptual preferences in learning among dental students in clinical subjects. *J Clin Diagn Res JCDR* 2013; 7(8): 1683–1685.
- Slater JA, Lujan HL, DiCarlo SE. Does gender influence learning style preferences of first-year medical students? *AJP Adv Physiol Educ* 2007; 31(4): 336–342.