Research Article

DIFFERENCES IN LEARNING STYLES AMONG COLLEGE OF APPLIED MEDICAL SCIENCE STUDENTS IN DIFFERENT SPECIALTIES IN KING SAUD BIN ABDULAZIZ UNIVERSITY FOR HEALTH SCIENCES IN RIYADH USING VARK QUESTIONNAIRE

Taha ismail*[1,2], Mohammed Almutairi[2,3], Yassin Ismaiel[4], Usama Abdulaal[1], Mohammed Alobaidy[1], Mohammed Algahtany[1] and Fatmah Othman[2,5]

[1]Department of Respiratory Therapy, King Abdulaziz Medical City, Ministry of the National Guard-Health affairs, Riyadh, Saudi Arabia
[2]King Abdullah International Medical Research Center, Riyadh, Saudi Arabia
[3]Pediatric Emergency King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia
[4]Department of Respiratory Therapy, King Abdulaziz Medical City, Ministry of the National Guard-health affairs, Riyadh, Saudi Arabia
[5]Research Unit, College of Applied Medical Sciences, King Saud bin Abdul Aziz University for Heath Science, Riyadh Saudi Arabia

A R T I C L E   I N F O

A B S T R A C T

Introduction: A learning style is one of the features that differentiate the student's performance. Many tools are existing in the literature that have been utilized to identify the students appropriate learning style. One of those is Visual Audio Reading/Writing Kinesthetic (VARK) questionnaire that used to identify student's learning style. However, there is no much data that examine the learning style among students in applied medical college. This study aimed to use the VARK questionnaire to identify students learning style at college of applied medical science.

Methods: 555 undergraduate students in College of Applied Medical Sciences (CAMS) at King Saud bin Abdulaziz University (KSAU-HS) in Riyadh were invited to fill out the questioner between September and November 2018. There were seven specialties within the CAMS College as follow: Respiratory Therapy, Emergency Medical Services, Occupational Therapy, Radiological Sciences, Clinical Laboratories, Anesthesia Technology, Cardiovascular Technology, and Clinical Nutrition. Total of 415 students (74.9%) completed the questionnaire successfully. A Chi-square test was used to examine the relation between the learning style and student score.

Results: 135 students (33%) preferred to use the four learning styles. Students in this study preferred multimodal learning style (67%) compared to students who prefer unimodal learning style (33%). Among those students, (28%) were auditory learners, and (27%) were kinesthetic learners. Both auditory/kinesthetic and visual/kinesthetic were the dominant learning preference of among students with bimodal learning style. Among students who have trimodal learning style, (32%) preferred visual/ auditory/kinesthetic learning style.

Conclusion: According to our findings, it clearly shows that the quad -modal which indicates that using the four learning styles: visual, auditory, reading/writing, and kinesthetic, is the most common learning style among CAMS students in KSAU-HS in Riyadh. Further study will be conducted to see the effect of changing the teaching methods in each specialty according to these results.

INTRODUCTION

Learning style is the way students use to understand, process, and recall information. Learning style depends on the student's personal variations in learning based on their preferences. [1-3]

Corresponding author: **Taha ismail**
Department of Respiratory Therapy, King Abdulaziz Medical City, Ministry of the National Guard-Health affairs, Riyadh, Saudi Arabia

Knowing a student's own learning style has an influence on how they absorb the information. [4,5]In order to identify the students' learning style there are many tools available, one of those is the Visual Audio Reading/Writing Kinesthetic (VARK) questionnaire. [6,7]

VARK questionnaire is learning styles instrument was developed and copyrighted by Neil Fleming.[6-8]The VARK questionnaire categorizes individuals as visual, aural,

reading/writing, kinesthetic, or multimodal. The questionnaire has 16 questions and the participant can select one or more answers to each question with each answer corresponding to one of the four categories. [9,4] The answers are accumulated by category and the highest score determines the students style under the four categories of VARK. If the highest score is shared by two or more categories, then the participant is multimodal learner. Multimodal individuals may use more than one category equally. The categories refer to the ways individuals prefer information to be delivered to them and the way that they would prefer to deliver information [10] "Visual individuals prefer diagrams, charts, and symbolism; Auditory individuals prefer auditory presentations; Read/Write individuals prefer text-based formats; Kinesthetic individuals are active, hands on learners, and multimodal individuals are equally flexible in more than one category". [11,12]

Teaching, especially in medical school, is a process which requires that both students and teachers constantly update themselves to match the need of the learning process. Thus, both teacher and students face challenges to deliver and process large amount of knowledge within the short time while maintain the ability of the students to retain and remember the taught material. [13]. Across many countries, many medical schools have adopted new approaches of teaching.[13,14]Many studies have indicated the need of understanding and knowing the learning styles , in that teachers can relate the teaching approaches with the learning styles of students.[14,15] Similarly, students behaviors and attitudes could be changed if they understand their learning style which could impact their learning process overall. [16]

Many studies have addressed the learning style among their study population using the VARK learning styles questionnaire. [17-20] Although the finding of these studies were varied in general, the using of multimodal learner was the most common in those studies. At national level, there were two studies that have been examined the learning style among undergraduate students at college of dentistry and nursing. [19-20] however, this is not have been examined among undergraduate students from college of applied medical science. Thus, in college of Applied Medical Sciences (CAMS) there are many specialties in which there are difference in teaching styles, materials, and tools that have been used in each program. Identifying the most coon learning style of students in each program would help the instructors to adapt the appropriate teaching approaches to enhance their learning process. The aim of this research, therefore; was to determine the most used style in each specialty in order to improve student performance.

METHODOLOGY

A cross sectional study were carried out at College of Applied Medical Sciences in King Saud Bin Abdulaziz University for Health Sciences in Riyadh between September 2018 and January 2019. The VARK questionnaire have been distributed among male and female students in all specialties which include Respiratory Therapy, Emergency Medical Services, Occupational Therapy, Radiological Sciences, Clinical Laboratories, Anesthesia Technology, Cardiovascular Technology, and Clinical Nutrition. We used stratify random sample technique in this study whereby the students from each spatiality were selected proportionally. Thus, a minimum of 232 students were estimated to be included in the study based on 582 total students, 95% confidence level: and 5% margin of error 5%. The VARK questionnaire has 16 questions in which the students can select one or more answers to each question. The questioner have been validaited previously in many reaserch. The sum of the anwer accumulated by category and the highest score detremine the students style under the four categories of VARK. multimodal learner were defined if the highest score is shared by two or more categories.

Statsitical analysis

Descriptive analysis was used for the students' demographic variables. we compared the learning style between male and female in each specialty, between specialties, and finally between levels of each specialty.A p-value less than 0.05 considered as statistically significant in comparing learning style and gender within each specialty. All analyses were carried out using STATA version 12 (Stata Statistical Software: Release 12. College Station, TX).

RESULTS

555 undergraduate students in CAMS were invited to fill out the questioner between September and November 2018. 415 students have completed the questioner, given response rate of 74%. Table 1 demonstrates the demographic characteristics of the study population and their learning style. One hundred and thirty-five (32%) students preferred to use the four learning styles. Male students were more common to use the four learning style compared to female students; however this difference was not significant. Students from radiological science, respiratory therapy, and occupational therapy program preferred using unimodal learning style while students from emergency medical service, clinical laboratory sciences, and anesthesia preferred using quadmodal learning style (figure 1). Figure 2 showed the prevalence of different learning styles among all students in the sample. Thus, majority of the student'spreferred multimodal learning style (66%) compared to students who prefer unimodal learning style (33%). Among those students, (28%) were auditory learners, and (27%) were kinesthetic learners. Both auditory/kinesthetic and visual/kinesthetic were the dominant learning preference of among students with bimodal learning style. Among students who have trimodal learning style, (32%) preferred visual/ auditory/kinesthetic learning style.

Table 1 The percentages of students who preferred bimodal, trimodal, and quadmodal according to their gender, year of study, and specialty

	Learning style number (%)				P value
	Unimodal	Bimodal	Trimodal	Quadmodal	
All	137(33)	75(18)	68(16)	135(32)	
Gender					0.42
Female	74(35)	36(17)	37(17)	61(29)	
Male	63(30)	39(18)	31(14)	74(35)	
Level					0.78
Junior	70(31)	42(19)	39(17)	70(32)	
Senior	67(34)	33(17)	29(15)	65(33)	
Specialty					0.15
Anesthesia	13(27)	8(16)	8(16)	19(39)	
Cardiovascular Technology	11(24)	13(28)	11(24)	10(22)	
Clinical Laboratory	8(38)	4(19)	1(4)	8(38)	

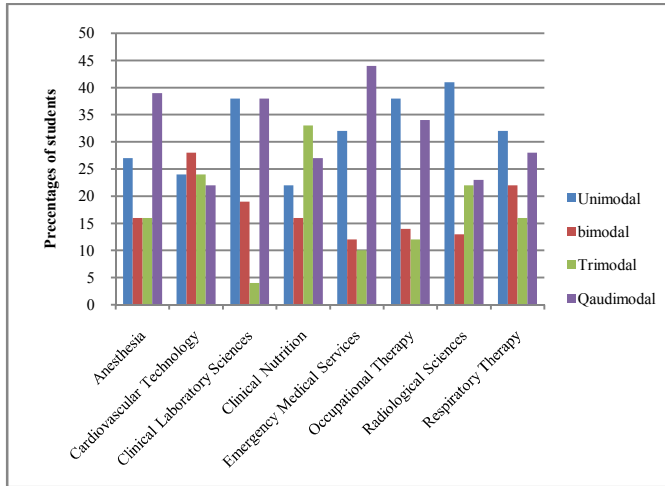|				
Sciences				
Clinical Nutrition	4(22)	3(16)	6(33)	5(27)
Emergency Medical Services	21(32)	8(12)	7(10)	29(44)
Occupational Therapy	29(38)	11(14)	9(12)	26(34)
Radiological Sciences	21(41)	7(13)	11(22)	12(23)
Respiratory Therapy	30(32)	21(22)	15(16)	26(28)

Figure 1 the percentages of students who preferred bimodal, trimodal, and quadmodal according to their specialty
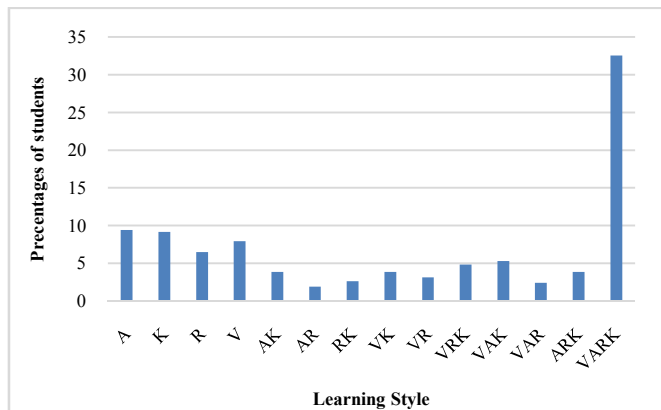

Figure 2 the prevalence of different learning preferences among all studnts in the study

DISCUSSION

In this study, we identified the learning preference of applied medical science students in Saudi Arabia, with emphasis on the effect of different specialty on the learning style preference. Regarding the learning styles of the total sample in this study, the results showed that 66% of the students preferred a multimodal learning and 33% preferred unimodal learning styles. Thus, our results were consistence with previous published studies that showed 56% to 73% of the students have multimodal learning preferences on medical and dental students.[10-13]However, there was inconsistence between the current study results and some finding form erlier study regarding the bimodal learning preference.[10] Differences in the prevalence of learning preferences between these studies may be explained by the differences in age, gender, culture, and academic level of the students participated in these studies. In term of the difference in learning style preference, our study showed that there was no difference between genders among students. This in agreement with the conclusion of previous studies that reported no significant difference observed between genders in dental and medical students. [11-13]

In the literature, there are several methods to measure the learning style. In the current study we utilized VARK questioner. Thus one strength point of this study is the reliability of the research instrument. Thus, the VARK questioner provides basic sensory preference in addition to identification of the learning preference. The main aim of this identification is to improve the learning process. Thus many research have recommend that teaching methods should try to match the learning studies in order to be more effective.[14-15] thus, educators have to utilize the prior knowledge of their students' learning style to tailor the teaching material and method of teaching according to their learning preference.[16]

This research has many limitations. Thus, the observational nature of this research could limit the generalizability of the results as the current study examined the learning style at one institution. Further studies that have samples from different institutions would provide more insight to this topic. Also, this was a cross sectional study and there is possibility of other factors that affect the learning styles could be addressed such as the effect of the society and cultural background.

CONCLUSION

According to our findings, it clearly shows that the quad - modal which indicates that using the four learning styles: visual, auditory, reading/writing, and kinesthetic, is the most common learning style among CAMS students in KSAU-HS in Riyadh. Instructors should utilized different teaching approaches in their teaching as students with multimodal learning style usually tend to achieve high in their academic performance.

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