RESEARCH ARTICLE

Learning styles, academic performance and mental health among medical students in King Faisal University, Saudi Arabia

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Abstract

Objective: To assess the prevalence of various learning styles and their correlation with academic performance and mental health of medical students.

Method: The cross-sectional study was conducted at the King Faisal University, Houfof, Saudi Arabia, from January to June 2019, and comprised medical students regardless of gender or the academic year. Data was collected using the Visual Aural Read/write Kinesthetic questionnaire. Depression Anxiety Stress Scales-21 was used to assess mental health. Data was analysed using SPSS 22.

Result: Of the 315 students, 179(57%) were males and 136(43%) were females. Overall, 152(48.3%) subjects preferred multimodal, while 163(51.7%) preferred unimodal style; 93(29%) aural, 53(16.8%) visual, 11(3.5%) read/write and 6(1.9%) kinesthetic. Males preferred visual and quardimodal styles of learning, while females preferred aural learning ($p<0.05$). Academic achievement was associated with learning style ($p<0.05$), but no relationship was observed between depression scores and learning styles ($p>0.05$).

Conclusion: The most preferred learning styles among medical students were found to be aural and bimodal.

Keywords: Learning styles, Academic performance, Mental health, Medical students, Saudi Arabia.

(JPMA 74: 436; 2024) **DOI: https://doi.org/10.47391/JPMA.683**

Introduction

Learning style is defined as "the method in which individuals perceive, process, interpret, organise and recall the information".[1] Students have different learning styles and preferences that helps them to gain knowledge and skills. Broadly, learning styles are divided into four categories: personality models, information-processing models, social-interaction models, and instructional preference models. The personality model assesses a student's traits. The information-processing model determines how students process information. The social-interaction model focuses on how a student acts in a social environment. Lastly, the instructional preference model examines a student's tendency to choose or express a preference for a specific instructional method or combination of methods.[2]

The Visual, Aural, Read/write, and Kinesthetic (VARK) is a learning inventory about instructional preference model.[3] The VARK model is one of the most utilised tools that portrays choices in terms of four kinds of usually-liked learning styles.[4] Visual learners learn through charts, diagrams, figures and maps; aural learners absorb information by listening to lectures and discussions; read/write style encourages learners to learn by reading books, notes and handouts; and kinesthetic learners learn to gather information best through experience and practice.[3,4]

Many factors influence students' learning preferences, like age,[5] gender,[6] culture[7] and academic discipline.[8] Literature reports inconsistent results regarding the relationship between learning styles and academic performance.[9] The current study was planned to explore the learning preferences and their correlations with academic performance and mental health of medical students.

Subjects and Methods

The cross-sectional study was conducted at the King Faisal University (KFU), Houfof, Saudi Arabia, from January to June 2019. After approval from the institutional ethics review committee, the sample size was calculated using Raosoft online calculator[10] while assuming response distribution to be 50% with a confidence interval (CI) of 95% and margin of error 5%. The sample was raised using random sample from among those studying in the KFU's College of Medicine. Those included were undergraduate students regardless of age, gender or academic year who volunteered to participate. Those who did not furnish consent were excluded.

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Data was collected at the beginning of the second semester using a self-reported questionnaire on learning styles and mental health, comprising a predesigned demographic sheet, VARK questionnaire and the Depression Anxiety Stress Scales-21 (DASS-21). All the questionnaires were presented in the English language in which the curriculum is taught at KFU. Academic performance was assessed by student's grade point averages (GPAs).

The 16-item VARK[11] questionnaire had four choices reflecting learning styles. Learners can be classified as unimodal, bimodal, trimodal, or quadmodal. The reliability and validity of VARK has been tested, and is considered adequate.[12] Permission to use the questionnaire was obtained from the copyright holder.

DASS-21[13] consists of 21 items, with 7 items each exploring symptoms of depression, anxiety and stress. Participants were asked to respond to each item on a 4-point Likert scale, ranging from 0=did not apply at all to 4=applied most of the time. The total score was derived by adding the scores of the items belonging to different dimensions, and mean scores were obtained.

Data was analysed using SPSS 22. Before the analysis, all variables were given possible codes. Descriptive statistics were used for each VARK component. Analysis of variance (ANOVA) was used to assess the difference in learning preferences in gender terms. To explore the relationship between learning styles, academic achievement, and mental health, a correlation test was used.

Result

Of the 356 students approached, 315(88.5%) participated; 179(57%) males and 136(43%) females. The overall mean age of the sample was 21.9±2.13 years (range: 18-25 years) (Table 1).

Of the total, 152(48.3%) subjects preferred multimodal, while 163(51.7%) preferred unimodal style; 93(29%) aural, 53(16.8%) visual, 11(3.5%) read/write, and 6(1.9%) kinaesthetic (Table 2).

Males preferred visual and quardimodal styles of learning, while females preferred aural learning (p<0.05) (Table 3).

Academic achievement, as represented by GPA, was associated with learning style (p<0.05), but no relationship was observed between depression scores and learning styles (p>0.05) (Table 4).

Discussion

The present study examined the learning preferences of medical students and their relationship with academic performance and mental health, showing that 51.7% students preferred to use one of the four modalities to learn, and 29% among them preferred aural learning. Similar findings were reported earlier.[14-17]

Table-1: Demographic and personal characteristics (n=315).

Characteristic	n (%)
Gender	
Male	179 (56.8)
Female	136 (43.2)
Academic Year	
Ist	56 (17.8)
2nd	68 (21.6)
3rd	60 (19.0)
4th	69 (21.9)
5th	62 (19.7)
Marital Status	
Married	34 (10.8)
Single	281 (89.2)
Area of residence	
Urban	240 (76.2)
Rural	75 (23.8)

Table-2: Preference related to learning styles.

Learning Modalities	n (%)
Style	
Visual	53 (16.8)
Aural	93 (29.5)
Read/write	11 (3.5)
Kinesthetic	6 (1.9)
Modes	
Bimodal	89 (28.3)
Trimodal	17 (5.4)
Quardimodal	46 (14.6)

Table-3: Difference in Visual Aural Read/write Kinesthetic (VARK) types and modes according to gender.

VARK	Male Mean±SD	Female Mean±SD	*p*-value
Types			
Visual	3.01±2.13	2.42±1.27	000**
Aural	3.17±1.90	3.19±1.50	0.04*
Read/write	1.35±1.21	1.50±1.13	0.42
Kinesthetic	1.24±1.01	1.32±1.04	0.98
Modes			
Bimodal	3.04±1.75	3.23±1.68	0.67
Trimodal	1.64±1.42	2.15±1.30	0.36
Quardimodal	2.51±2.06	2.16±1.58	0.00**

Table-4: Coefficients of correlation scores of VARK learning styles with GPA and mental health.

Variables	Visual	Aural	Read/write	Kinesthetic	Bimodal	Trimodal	Quardimodal
GPA	-0.16**	-0.04	-0.02	-0.15**	0.25**	0.06	0.01
DASS							
Depression	-0.04	-0.44	0.22	-0.01	0.35	0.15	0.04
Anxiety	0.07	0.15	0.01	-0.10	0.00	0.39	0.12
Stress	-0.03	-0.40	0.10	-0.02	0.29	0.19	0.09

In terms of VARK modes, 48.3% students preferred to use more than one learning styles (multimodal), with 28.3% favouring bimodal which is similar to previous findings.[18] The VARK styles of learning showed significant differences along gender lines which is in line with previous studies.[19-24]

The present study also examined the impact of learning styles on academic performance and mental health. Results of coefficients of correlations revealed that GPA was negatively and significantly related to the visual and kinesthetic type of learning. The negative relationship between visual and academic performance is a unique finding, and has not been reported previously in literature. Regarding the significant negative relationship of kinesthetic learning with academic performance, it was consistent with previous studies.[25] The reason might be that medical students might spend more time reading and listening to lectures than in active learning due to their curriculum design. One of the main findings of this study was that GPAs were positively and significantly related to bimodal mode of learning. To our knowledge, no previous study supports these results. Limited research has evaluated the relationship between learning styles and GPAs among medical students. For instance, a study[26] reported that there was a significant relationship between GPA and quardimodal learning style. The different styles of learning were not related to depression, anxiety and stress in the current study, and this is parallel to previous research.[27]

The present study has several limitations. First, the data was collected from a single medical college. Data gathered in this context may therefore be unique, and it is entirely possible that replication of this study in different parts of the country might yield different results. Second, as measures used were based on participants' self-reports and reflections, the scores were likely affected by those individuals who wanted to appear more or less socially desirable. Third, the cross-sectional design does not allow for drawing conclusions regarding causality. Longitudinal research is needed to support the conclusions of the present study. Lastly, the sample size was relatively small and homogeneous which limits generalisation.

Conclusion

The most preferred learning style among medical students was found to be aural among those who preferred unimodal, followed by bimodal. There were significant differences in terms of gender and academic achievement in relation to different learning styles, but mental health was not related to any specific learning style.

Disclaimer: None.

Conflict of Interest: None.

Funding Sources: This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia (Grant No. GRANT4125).

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