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Learning Style for First Year Saudi Medical Students at Qassim University: Gender Differences

Mahfoudh A. M. Abdulghani[1*], Mohammed S. S. Al-Dhubaibi[2], Meshal M. A. Alhameedy[3] and Mohammed A. Alnuwaysir[3]

[1]Department of Pharmacology, Unaizah College of Pharmacy (UCP), Qassim University, Unaizah, 51911, Al Qassim, Saudi Arabia.
[2]Department of Dermatology, College of Medicine, Qassim University, Buryddah, 51431, B.O 1064, Al Qassim, Saudi Arabia.
[3]College of Medicine, Qassim University, Buryddah, 51911, Al Qassim, Saudi Arabia.

Authors' contributions

This work was carried out in collaboration between all authors. Author MSSAD designed the study, wrote the protocol and supervised the work. Author MMAA carried out all laboratories work and performed the statistical analysis. Author MAMA managed the analyses of the study and wrote the first draft of the manuscript. Author MAA managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Studies on learning preferences of medical students in Saudi where medical education, as well as the environmental education, differ greatly from Western countries are limited. Students have preferences for the modes in which they collect information. The objective of this study was to categorize learning preferences of Qassim University's male and female medical students.
Study Design: A descriptive cross-sectional study.
Place and Duration of Study: First-year medical students at Qassim University Medical College, between March 2015 and June 2015.
Methodology: The visual, auditory, reading/writing, kinaesthetic (VARK) survey categorises students' favourites for certain modes of information presentation. The VARK survey was

**Corresponding author: E-mail: mahfouz08@gmail.com, ma.abdulghani@qu.edu.sa;*

distributed to our first-year medical students, and 75 of 150 students (50%) returned the surveys completed.

Results: The majority of male (92.47%) and half of the female (50.09%) students prefer a single mode of information presentation. Male and female showed similarly preferences in all modes of information presentation, including visual learning from diagrams, graphs, and flow charts, auditory learning from verbal expression, and reading/writing learning from texts, but kinaesthetic learning from hands-on, demonstration and sight. In kinaesthetic, female (40.14%) showed more preference than male (28.04%). In contrast, most female students (49.91%) and a few male students (7.53%) preferred multiple modes whereas male (53%) and female (47%) showed similarly preferences in the bi-modal. Male students (23%) showed greater preference of tri-modal than female (13%), in contrast to the female students (40%) showing more preference of the quad-modal than male (24%).

Conclusion: Knowing student's preferred modes can a) assist in providing appropriate instructions that are personalised to the student's individual requirements, b) conquer the tendency of treating all students in an analogous mode, and c) encourage instructors to move from their favoured mode(s) to using others.

Keywords: Learning styles; medical school; VARK questionnaire; medical education; Qassim University.

1. INTRODUCTION

Learning styles was defined as, "an individual's natural, habitual and preferred way of absorbing, processing and retaining new information and skills" [1]. Several constructs for learning styles have been reported in the literature [2]. These constructs describe the same phenomenon but from different perspectives [2]. Among these constructives are Ehrman and Leaver [3], Kolb [4], and Fleming and Mills, [5]. Five learning style instruments have been reviewed including the Kolb Learning Style Indicator, the Gregorc Style Delineator, the Felder–Silverman Index of Learning Styles, the VARK Questionnaire, and the Dunn and Dunn Productivity Environmental Preference Survey [6].

Among the instruments/inventories in the category of instructional preferences is the Visual, Aural, Read-write, and Kinaesthetic (VARK) questionnaire developed by New Zealand educator [6]. VARK is a simple questionnaire designed to help students learn more effectively and to help academic staff become more sensitive to the diversity of teaching strategies necessary to reach out to all students taking cognisance of their individual learning preferences.

The VARK instrument defines the learning preference based on the sensory modality in which a student prefers to take in new information. The learning modalities as classified according to the VARK (an acronym), presents learning styles inventory into four; the Visual, Aural, Read/Write and Kinaesthetic [7], relying on the neural system with which a learner prefers to learn. Thus, VARK is a perceptual, instructional favourite model that classifies learning by sensory preferences. Although learners can practice all of these sensory modes of receiving information, one mode is habitually dominant and preferred. For example, visual learners prefer to receive information by viewing illustration drawings, images, and other image-rich teaching tools. Auditory learners receive information through listening to speeches, discovering topic through discussions, and talking through ideas. Reading/writing learners acquire through interaction with written documents while kinaesthetic learners gain knowledge by hands-on and practises that emphasize doing, bodily participation, and handling of items.

Educational instructions in Saudi Arabia are traditionally given along gender line. The division is based on Islamic principles that prohibit intermixing between men and women, and the cultural attitudes of the Saudi society [8]. Qassim University medical College is composed of two separate sections; one for male and the other for females, thus conforming to the cultural norm. One of the most common concerns all over the world is the dissatisfaction of both the students and teachers regarding teaching and assessment. Multiple variables may affect this phenomenon. Study on learning styles indicated that students achieved statistically higher test scores if taught using their preferred sensory modalities.

The sensory modality refers to the physical, perceptual learning channels with which the student is most comfortable and able to interpret given instructions through the senses [9]. This modality has been divided into four areas visual (seeing), auditory (hearing), and tactile (touching), and kinaesthetic (moving) [10]. It has been established that greater educational productivity can be achieved by knowing a students' learning style preferences [3]. Furthermore, it is also a good starting point in helping the students to target and adapt to styles for which they have a lesser preference.

It has been observed that little attention is paid to identifying students' learning styles in medical institutes [11]. Of recent, few studies were documented on the preferred learning styles of Saudi undergraduate medical students [11,12,13]. However, there have been no previous studies on learning style preferences of Saudi medical students and how these preferences are likely influenced by such factors as gender, information that is of vital importance in offering high-quality education according to Wehrwein et al. [14]. Therefore, the aim of this study was to investigate the learning style preferences of first-year medical students in a single academic institution (Qassim University) in Al-Qassim, Saudi Arabia, using the Arabic version (version 7) of the VARK questionnaire and to determine the association between learning style preferences and gender.

2. METHODOLOGY

2.1 Setting and Participants

A descriptive cross-sectional study was conducted in 2015. Of the 150, 75 volunteers (60 male and 15 female) participated in this study.

2.2 Instrument

The VARK survey (Version 7.8) was used in current study. The survey measures four perceptual favourites (V, A, R, and K). The survey contains 16 questions with four choices each. The outcome of each question is to categorize the learning style favourites of respondents. Respondents can choose more than one choice to recognise their favourites for multiple learning styles. Satisfactory levels of reliability and validity of the VARK have been reported using factor analysis techniques [13].

2.3 Procedures

The VARK survey was administered to first–year medical students during a regular session of 2015 and students were requested to complete and return the survey to the investigators. The investigators properly informed the participants that the study intends to measure the distribution of learning styles favourites of students. The findings of study would be used for research purposes. The study was approved by the Institutional Review Board of the College of Medicine, Qassim University, Buraidah, Saudi Arabia.

2.4 Statistical Analyses

The distributions of the VARK favourites were calculated according to the guidelines in the VARK website [7]. Descriptive statistics was used for each VARK component. To calculate the percentage of students for each VARK component, the number of students who preferred each learning style modality was divided by the total number of participants (n=75).

3. RESULTS

Fig. 1a represents the percentages of male students who preferred visual (V, 20.40%), auditory (A, 28.80%), reading/writing (R, 18.23%), kinaesthetic (K, 28.04%), and multiple modes (7.53%) of information presentation. Fig. 1b presents the percentages of female students who preferred visual (18.43%), auditory (33.13%), reading/writing (22.00%), kinaesthetic (40.04%), and multiple modes (49.91%) of information presentation.

Fig. 2a represents the percentages of male students having a preference for the respective modes of information presentation. Of the 60 male students who participated, 7.53% preferred multiple modes of information presentation; 53% preferred two (bimodal) modes; 23% preferred three (tri-modal) modes whereas 24% preferred four (quad-modal) modes. Fig. 2b represents the percentages of female students having a preference for the respective modes of information presentation. Of the 15 female students who participated, 49.91% preferred multiple modes of information presentation; 47% prefer the two (bimodal) modes; 13% prefer the three (tri-modal), modes whereas 40% prefer the four (quad-modal) modes. Fig. 3 shows specific

Multimodal Preferences among Male and Female Students. Fig. 3a represent specific Multimodal Preferences among Male students. Of the male students who prefer bimodal; 11.90% prefer visual and auditory (VA), 7.14% prefer visual and reading/writing (VR); 9.52% prefer V and kinaesthetic (VK); 4.76% prefer audio and reading (AR), 14.29% prefer RK whereas the majority of the students (35.71%) prefer audio and kinaesthetic (AK). Of the male students who prefer tri-modal, 2.38% prefer VAR; 7.14% VAK; and 2.38% each for ARK; and VRK respectively. In the quad-modal, 2.38% of students were found to prefer VARK. Fig. 3b represent specific Multimodal Preferences among Female students. Of the female students who prefer bimodal, 21.43% prefer VA; 3.57% prefer VR; 17.86% prefer VK; 3.57% prefer AR; 7.14% prefer AK. The majority of female students (32.14%) prefer of the female students, 3.57% were found to prefer the tri-modal VAR and 10.71% prefer the quad-modal, VARK.

4. DISCUSSION

In current study, we disturb the VARK survey to our first-year medical students at Qassim University to determine their favoured modes of information presentation. Seventy-five (50%) of the total one hundred and fifty students completed and returned the questionnaire. The majority (92.47%) of the male participants indicated a preference for single (visual (V), auditory (A), reading/writing (R), or kinaesthetic (K) modes of information presentation (Fig. 1a), as opposed to 50.09% of the female participants. The finding in our study is consistent with the previous study conducted by Al-Saud [11], with Saudi dental students showing the male students having more preference for single mode than the female students. In contrast, to our study that showed variation in preferences, the study by Muralidhara et al. [15] with preclinical medical students reported no preferential differences between male and female.

In this study, only 20.40% of the male and 18.43% of female students preferred the single (visual) mode of information presentation. These students prefer to receive information in the form of graphs, charts and flow diagrams [16,17]. They can work easily with symbols and are sensitive to changing spatial arrangements [18]. Of the total participants, 18% of the students indicated a preference for learning using their senses notably touch, hearing, smell, taste, and sight. This group of students was described as kinaesthetic. They prefer physical, multisensory experiences in their learning processes. Similarly, 18.23% and 22.00% of male and female students respectively prefer for accessing information from printed materials. They use reading and writing as their mode of assimilating information. These students were labelled as reading/writing learners.

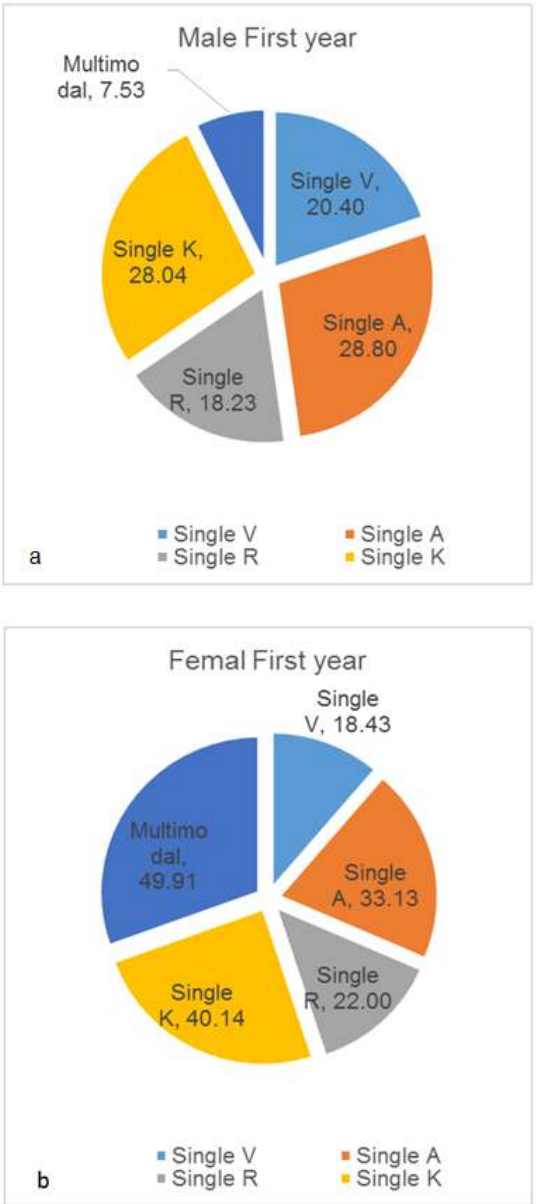

Fig. 1. Percentages of male students (Fig.1a) and female Students (Fig.1b) who of learning preferred single modes and multiple modes

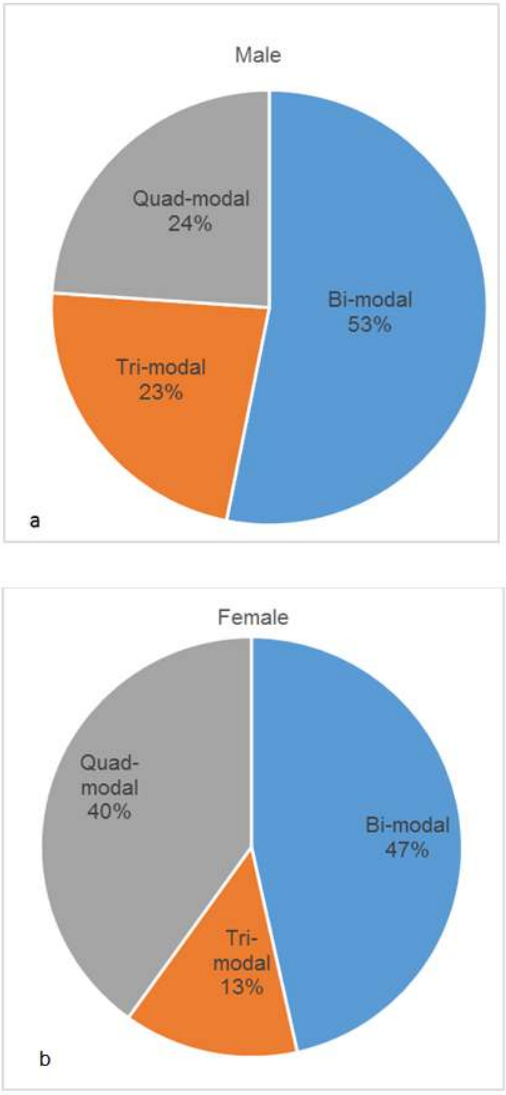

Fig. 2. Percentages of male students (Fig. 2a) and female students (Fig. 2b) who of learning preferred multiple modes

Both male (28.80%) and female (33.13%) students respectively prefer receiving information through verbal communication, which arrives at the learner's ear and are therefore coded as auditory learners. In our study, only 28.04% of the male and 40.14% of female students respectively prefer kinaesthetic. Our finding is therefore in support of a previously reported study [14,19]. Wehrwein et al. [14] found that the kinaesthetic style was the preferred single style for female students. Park, [19] also showed that across the four ethnic groups they studied, female students have a higher preference for a kinaesthetic learning style than male. The current result is, however, inconsistent with Dobson [20] who found that the kinaesthetic learning style was the least preferred by both genders. The age characteristic of students, as well as the culture of control on females, were suggested reasons [21]. It has been suggested that knowledge of the students' preferred learning modes can provide a focus for developing strategies that are personalised for individual learners and can help reach more students because of improved match between teacher's approach and learner's learning style [18].

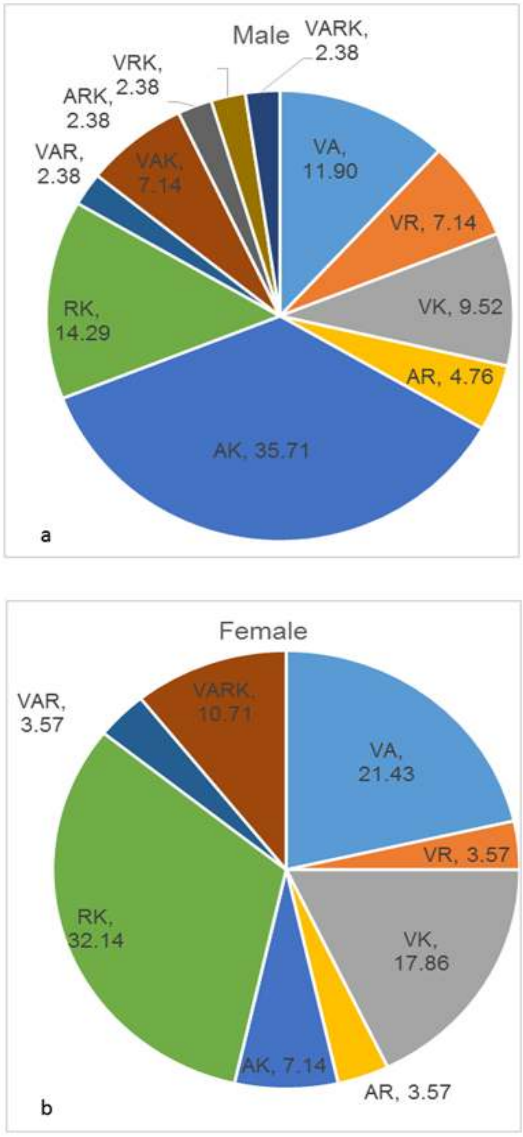

Fig. 3. Percentages of male students (Fig. 3a) and female Students (Fig. 3b) who of learning preferred specific multiple modes

Our study showing that the multiple modes of information presentation is the preferred mode by the majority (49.91%) of female students (as opposed to 7.51% of male students), appear to be inconsistent with Saadi [21], who reported that male students are more inclined to multiple modes of learning style, while females prefer single learning styles. Students preferring multiple modes of information presentation. These students can benefit from active learning approaches over the traditional lecture approaches. Because students with multiple learning modes (visual, auditory, reading/writing, and kinaesthetic) can be reached by Active learning approaches. In contrast, the traditional lecture approaches can reach only students with auditory learners. Because the traditional lecture approaches all students receive information passively without interaction with the presenter. In the group of students preferring multiple modes, both male and female students showed similarity in preferring bi-modal approach and having the highest preference of 53% (male) and 47% (female) respectively. In contrast, the tri-modal and quad-modal preferences for the male and female students exhibited some notable differences. While the male learners showed similar values for both tri- (23%) and quad- (24%) modes, the female tri-model was much less (13%) less than for the quad-modal of 40%. The female thus showing more quad-modal preference than male.

In the bi-modal approach, our study has revealed that the male indicated less preference in VA 11.90%, VK 9.52 and RK 14.29% than female VA 21.43%, VK 17.86 and RK 32.14% respectively. In contrast, the male showed higher preference in VR 7.14%, AK 35.71 than female (VR 3.57%, and AK 7.14).

In the tri-modal, the male showed a variety of combination preferences (VAR, VAK, VAK, ARK) and VRK), whereas the female showed preference in only VAR. In quad-modal, the male showed a lesser preference of 2.38% than the female (10.71%).

The current finding has revealed that Saudi students are diverse in their preferences for information presentation, from single to multiple modes. Within the multiple modes, the students also showed some notable differences from bi-modal to quad-modal. In order to meet the students' needs and expectations, teaching styles must be multisensory and should be filled with a variety of approaches and with the lecturers/instructors providing a blend of visual, auditory, reading/writing, and kinaesthetic activities. The use of active learning strategies has been suggested to achieve this goal [22,23]. With active learning strategies, V-mode learners prefer information to be presented in the form of pictures, diagrams, and film. They should be targeted with models other than visual and demonstrations [16,17]. A-model learners are reached through listening to the discussion, answering questions, collaborative testing, debate, and games [16,18,24-26]. Kinaesthetic and tactile learners can be satisfied using manipulating models, hands-on experiences, and role-playing [16,25,27,28]. The cooperative learning exercises, debates, games, models, role playing, and simulations are active learning strategies that can be used effectively in large classrooms. These activities also encourage working in groups and produce high levels of enthusiasm and motivation. Furthermore, researchers have reported improvement in achievement of students with utilise of simulations and games [29]. So in promoting thinking, reasoning, problem-solving, and decision-making skills, active learning approaches has been suggested to be superior to the traditional lecture format.

5. FUTURE DIRECTIONS

The rationale for this study was to support us design teaching approaches that can address most of the students' needs in relation to their favourites for modes of learning and to recognise areas for further research. With respect to future research, several queries regarding learning styles arose from this study. For example, in the classroom performance of the learners with multiple-mode perform and with single-mode are different? In specific classes, how grades correlate with learning styles, e.g., do kinaesthetic and aural learners perform better in laboratory and lecture classes respectively? Does learning outcomes really address by accommodating learning preference? All of these queries merit further research.

6. CONCLUSION

Saudi female and male medical students have significantly different learning style preferences. Therefore, this diversity of learning styles among the students should be addressed by instructors. Addressing the students' preferred modes can lead to enrich the learning experience and lead to develop appropriate learning approaches.

7. STUDY LIMITATION

Instrument limitations, one thing that most learning style instruments have in common is a lack of solid research on their psychometric properties. Learning style instruments tend to be constructed in isolation from one another without much attempt to validate their underlying constructs, because the concept of style appeals so strongly to educators and learners alike. Sample size limitation, small number both male and female of student.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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