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ASSESSMENT OF LEARNING STYLE PREFERENCES UTILISING THE VISUAL (V), AUDITORY (A), READ/WRITE (R), AND KINAESTHETIC (K) (VARK) QUESTIONNAIRE: A CROSS-SECTIONAL STUDY

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Abstract

Background

The learning preferences of medical students are quite diverse. Therefore, to successfully adapt instructional tactics and approaches to meet the requirements of each student and foster a conducive learning environment, educators must be aware of the various learning styles. Therefore, an insightful tool to evaluate learning styles is the VARK instrument, which stands for visual (V), auditory (A), read/write (R), and kinaesthetic (K).
The study has been conducted to identify learning style preferences among students of MBBS first year.

Materials and methods

The study was a cross-sectional study. The research has been conducted for 3 months at Dharanidhar Medical College and Hospital, Keonjhar, Odisha, India. Consent was obtained from the participants before initiation of the study. VARK questionnaire has been provided to the enrolled participants in the form of Google Forms. The student's preferences for different VARK components were examined using descriptive statistics.

Results

Overall**,** 160 students participated in the study. Among all the participants, 90 students were male, and the rest 70 were female students. Visual, auditory, read/write and kinaesthetic approaches were present in 08 (17.7%), 05 (11.1%), 03 (6.6%), and 29 (64.4%) of participants respectively in the unimodal approach of learning**.** Learning styles incorporating visual, aural, read/write, and kinaesthetic methods were shown to differ significantly.

Conclusion

The results of this study provided considerable support for the usage of blended learning by educators to accommodate a variety of learning preferences and foster learning. Levels of the student learning process have been determined by seeking the preference of different learning styles by the students and with the use of innovative and multimodal teaching methods to make the classroom.

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Introduction

Students must acquire a great deal of knowledge in a short amount of time through the rigorous curriculum of medicine. The learning preferences of medical students are quite diverse. It has always been difficult for the lecturers to satisfy the needs of every medical student. Information obtained via gathering, interpreting, processing, organizing, and thinking is referred to as learning styles [1]. However with the increasing global interest in innovative teaching and learning approaches, as evidenced by the recent guidelines of the Medical Council of India for undergraduate medical education, now is the perfect time to carefully alter the traditional teaching techniques [2].
An individual's learning style is influenced by their social surroundings and past experiences [3]. Various models were used in earlier times such as The learning style theories of Honey and Mumford, the VARK model, and Kolb's Learning Styles Inventory [4, 5, 6]. Numerous psychological ideas, learning theories, and learning principles serve as a framework behind these models. The VARK model is among the most suitable, dependable,

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clear, and basic of them. The VAK learning style model was modified by Fleming (2006) to form the VARK model [5]. VARK categorizes learning based on sensory preferences. The letters VARK stand for visual (V), auditory (A), read/write (R), and kinaesthetic (K). This learning inventory falls within the category of "instructional preference" models. Graphs, pictures, diagrams, and handouts are useful study aids for visual learners; lectures, discussions, and recordings are helpful for auditory learners; read-write learners take notes while reading texts; and kinaesthetic learners learn through experimentation, dissection, taking case histories, and clinical examinations. These learning methods help students improve their ability to process information. The content can be taught to pupils using one or more of the following: one unimodal, two bimodal, three trimodal, or four quadrimodal sensory preferences [7].

The study seeks to evaluate different preferred learning styles and modes of learning among first-year Bachelor of Medicine and Bachelor of Surgery (MBBS) students using the VARK questionnaire.

Methodology

Study Design

It was a cross-sectional study

Study setting

The study was conducted among first-year MBBS students at Dharanidhar Medical College and Hospital, Keonjhar, Odisha, India. The study was conducted for three months (August 2024 - October 2024).

Participants

Overall, 160 participants were included in the study.

Inclusion Criteria

1. First-year MBBS students enrolled at Dharanidhar Medical College and Hospital, Keonjhar, Odisha, India.
2. Students who provided informed consent to participate in the study.
3. Students who completed the self-administered VARK questionnaire (version 7.8) fully.

Exclusion Criteria

1. Students who did not complete the VARK questionnaire or submitted incomplete responses.
2. Students who were absent or unwilling to participate during the data collection period.

The study may face self-reporting bias, as participants might misinterpret questions or provide socially desirable responses, affecting data accuracy. Additionally, selection bias could arise from excluding non-consenting or absent students, limiting the generalizability of the findings to all first-year MBBS students.

Study Procedure

A questionnaire named VARK questionnaire, which was of version 7.8, was self-administered by the students of first-year MBBS respectively. The students were given a Google form to fill out, which included 16 questions and 4 alternative solutions. Each question allowed students to choose many responses, allowing them to choose their preferred learning style. The maximum score for the questionnaire was 64, while the minimum score of the questionnaire was 16. Finding out the preferred learning styles is the aim of each inquiry. If the student preferred only one of the four VARK learning styles, they were categorized as having an "unimodal" learning style; if they preferred more than one, they were categorized as having a "multimodal" learning style. Within the multimodal category, various models including the bimodal, trimodal, and tetra-modal learning modes were constructed based on the respondent's chosen VARK learning style.

Data Collection

The research participants, who were students, gave their consent. Following a brief explanation of the study's objectives, a questionnaire was given out. After completing the demographic information, the students were prompted to select an answer for each question. Throughout the whole study, confidentiality was upheld. The VARK guide's material was used to evaluate the questionnaire replies.

Statistical Analysis

Statistical analysis was done using SPSS version 20. To examine the student's preferences for different VARK components, descriptive statistics were employed. The chi-square test was used to evaluate the preferential learning strategies of male and female students. The mean scores of the different VARK components were compared using ANOVA. Males' and females' mean scores for each VARK component were compared using an independent t-test.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Results

The research involved 160 people in total. There were 70 (43.7%) female participants and 90 (56.2%) male participants overall. In the Multimodal mode of learning alone, significant differences were noted between participants who were male and female. Table 1 represents

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a mode of learning preferences among first-year MBBS students.

Table 1. Mode of learning preferences among the first year MBBS students

Mode of Learning	Male (n=90)	Female (n=70)	p-value
Unimodal	28 (31.1%)	17 (24.2%)	0.17
Bimodal	14 (15.5%)	21 (30%)	0.01
Trimodal	19 (21.1%)	09 (12.8%)	0.87
Tetramodal	29 (32.2%)	23 (13.5%)	0.46

Data were presented as n (%). p-value was considered significant at <0.05. t-test was used to obtain a p-value

Table 2 shows various learning styles among the students. Visual, auditory, read/write and kinaesthetic approaches were present in 08 (17.7%), 05 (11.1%), 03 (6.6%), and 29 (64.4%) of participants respectively in the unimodal approach of learning. VARK approach was observed to be seen in all fifty-two students.

Table 2. Various learning styles among the first year MBBS students

Mode of Learning	Learning Style	Total
Unimodal (n=45)	Visual (V)	08 (17.7%)
	Auditory (A)	05 (11.1%)
	Read/Write (R)	03 (6.6%)
	Kinaesthetic (K)	29 (64.4%)
Bimodal (n=35)	VK	11 (31.4%)
	AK	17 (48.5%)
	RK	07 (20%)
Trimodal (n=28)	VAK	19 (67.8%)
	VRK	04 (14.2%)
	VAR	05 (17.8%)
Tetramodal (n=52)	VARK	52 (100%)

Data were presented as n (%)

Table 3 shows the mean scores of individual VARK components. Significant differences were observed in learning styles involving visual, auditory, read/write, and kinaesthetic.

Table 3. Mean scores of individual VARK components

Learning Style	Data	p-value
Visual	7.16±3.44	0.001
Auditory	7.82±3.74	
Read/Write	4.79±3.48	
Kinaesthetic	10±3.58	

Data were presented as mean±SD. p-value was considered significant at <0.05. The chi-square test was used to obtain a p-value

Discussion

The VARK questionnaire was evaluated in the present study to determine the different learning styles of first-year MBBS students. The four various sensory modalities utilized for learning—visual, auditory, read/write, and kinaesthetic—are measured by the VARK learning style inventory. The most popular sensory modality among unimodal learners was kinaesthetic (64.4%), which was followed by visual (17.7%), auditory (11.1%), and read/write (6.6%). Research carried out by Sangam MR et al. found similar outcomes [8].

The way we absorb and comprehend knowledge is what determines our learning style, not our IQ or innate abilities [9]. It may be used for the acquisition of information, constructive abilities, and mindset. The increasing use of artificial intelligence and technology in the classroom may present an opportunity to address various learning

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styles of the learners including text, video, audio, graphics, and interactive features. The majority of male and female participants in this study are tetra modal and unimodal learners, respectively. Male and female learning styles differ greatly from one another. However, given the limited sample size, no conclusions on the impact of sex can be drawn.

The need for multimodal learning in the present medical curriculum is growing as teaching strategies [10].

Academic performance is not the only factor that matters; learning will be compromised if learning styles are disregarded. A key element in raising the caliber of medical education is medical students' awareness; if the material is delivered to them in a way that suits their preferred learning style, they will absorb it more readily [11].

Generalizability

The study's external validity is influenced by its focus on first-year MBBS students at a single medical college in Odisha, which may limit the generalizability of its findings to other student populations or educational settings. However, its use of the VARK questionnaire, a widely recognized and validated tool, provides a foundation for applicability to similar cohorts of medical students elsewhere. Differences in institutional teaching methods, cultural contexts, and student demographics should be considered when extrapolating the results to other settings.

Conclusion

The present study evaluated the VARK questionnaire to show that kinaesthetic learning is the most common learning style and that tetra-modal learning accounted for the majority of students' learning styles. Despite a clear difference in the learning styles of boys and females, the results cannot be applied universally. Understanding different learning styles is critical to raising educational standards, learning capacities, and teaching effectiveness. It assists teachers in addressing the learning challenges that kids have, enabling them to help pupils learn more efficiently and succeed academically. Teachers who modify their pedagogical approaches to accommodate students' varying learning preferences might inspire their pupils and boost their output.

Limitations

The first limitation of this study was its sample size's relative smallness, especially considering the small proportion of female students. Only first-year MBBS students had taken part in this study. The fact that the study was limited to one center is another drawback. Numerous centers may also be able to assist in determining other issues.

Recommendation

Educators should implement blended and multimodal teaching strategies to cater to diverse learning preferences, enhancing engagement and knowledge retention among medical students. Regular assessment of learning styles can further optimize instructional methods for improved academic outcomes.

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List of abbreviations

MBBS - Bachelor of Medicine and Bachelor of Surgery
VARK - Visual, Auditory, Read/Write, and Kinaesthetic (learning styles model)
VK - Visual and Kinaesthetic (bimodal learning style)
AK - Auditory and Kinaesthetic (bimodal learning style)
RK - Read/Write and Kinaesthetic (bimodal learning style)
VAK - Visual, Auditory, and Kinaesthetic (trimodal learning style)
VRK - Visual, Read/Write, and Kinaesthetic (trimodal learning style)

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Conflict of interest

The authors have no conflicting interests to declare.

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