

ORIGINAL ARTICLE

LEARNING STYLES ASSOCIATION WITH ACADEMIC PERFORMANCE AMONG NURSING STUDENTSSahib Jahan¹, Sardar Ali², Sher Bahadur³, Dildar Muhammad⁴, Iffat Aisha⁵, Tariq Ahmad⁶**ABSTRACT**

Introduction: Nursing education is an evolving sphere and knowing learning styles of the students may play a crucial role as a foundation for designing suitable teaching strategies. Integration of instructional strategies according to the preferred learning styles of students in nursing education may bring excellence in their academic performance. Therefore, the impact of learning styles in association to the academic success of the nursing students need to be researched in order to have better outcomes in teaching and learning process.

Material & Methods: A cross-sectional study was carried out to determine the association of learning styles with academic performance among nursing students. Permission was granted from the review boards, concerned departments and participants of the study. Data was collected through VARK questionnaire. Data were analyzed using SPSS version 20. Chi-square tests were applied for comparison between grades of students with different learning style while ANOVA was used to compare mean marks obtained and Grade Points, where P-value <0.05 was considered as significant.

Results: A total of 177 sampled population with mean age of 23.9 ± 5.515 participated in the study. Around 60 (33.9%) males and 117 (66.1%) female participated in the study. Most 99(54.8%) of them liked students centered teaching approach. The most common learning style was noted as Kinesthetic 56 (31.6%) followed by 38(21.5%) of read and write. There was no significant difference regarding the pattern of learning styles among Generic and Post RN BSN students ($p=0.201$).

Conclusion: Kinesthetic and visual learning styles were found the most preferred learning styles among nursing students as compared to the auditory or reading styles. Results showed that preferred learning style had a positive impact on the academic performance. Findings of the study further reflected that academic performance has a significant association with the learning styles of the student in nursing education therefore teaching and learning strategies must planned according to the learning styles of the students to excel the overall learning process and academic achievement of the students.

Key Words: academic performance, learning style, learning outcomes, nursing students

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Authors' Affiliation

¹Principal, Shahid College of Nursing, Shabqadar, Charsadda

²Assistant Professor, Institute of Nursing Sciences, Khyber Medical University, Peshawar

³Assistant Professor, Khyber Institute of Child Health, Peshawar

⁴Associate Professor, Institute of Nursing Sciences, Khyber Medical University, Peshawar

⁵Nursing Tutor, Government College of Nursing, Mardan

⁶Assistant Professor, Khyber College of Dentistry, Peshawar

Corresponding Author

Sardar Ali

Assistant Professor, Institute of Nursing Sciences,

Khyber Medical University, Peshawar

Email: sardar.ins@kmu.edu.pk

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INTRODUCTION

Each individual learner has a distinctive learning approach which is considered as a fundamental predictor during the studies that how a student or learner observe, relate and react to the learning atmosphere.¹ Awareness to one's own learning method may assist and improve the eminence and quality in wisdom and learning.² Nursing education is progressing around the world and preferences in learning process are getting attention among the students. Therefore, students must have to be considered for their favored learning approach as it affects the academic achievement among the students.³⁻⁴ It also becomes an imperative obligation of the facilitators to guide the students with such a loom of instructional strategies that are thought to be compatible to their learning methods and styles.⁵⁻⁶ It has been found that the academic accomplishment is candidly and responsively linked to the inclination of the specific learning style among the students. Previous studies propose that students in nursing disciplines may review into their dimensions and capabilities to improve their knowledge with the best use of their preferred learning styles.⁷⁻⁹ Various instruments have been developed to measure and identify the learning styles among the students however VARK model (Visual-Aural-Reading-and Kinesthetic) is one of the frequently used method of assessment in this regard.¹⁰⁻¹² Learning styles actually evolve over a period of time during the development of individual which ultimately become the preference of learning style.³ It reflects that the knowledge acquisition take place over a course of transformation of experiences. The new exposure and experience lead to capability of that person to get new knowledge and concepts. This also increases the cognitive ability and wisdom of the learners.⁴ knowing about learning style or preference of a learner is very important because it can help to organize the teaching material accordingly and also help to plan about to learn and adopt new learning styles which helps in getting in-depth understanding about the topic under study. This can lead to enhance learning quality and ultimately enhance the learning.⁵ It is therefore significant to recognize that which learning method is effective. This question adds more

importance in teaching and learning outcome in nursing education.¹ Knowing the differences among the learning styles and its outcome in terms of academic performance is very helpful in making effective teaching strategies. Learning styles have been reported as an effective tool for scheduling of operative and well-organized teaching and learning process. A well-organized teaching has been proven to be influential towards performance of the learners.⁶ In this regards the teaching styles play an important role because teachers have to ensure that the concept about the topic has efficiently transferred. Hence teachers need to prepare teaching material and execute these materials according to learning style of the students meaning that they have incorporated teaching strategies according to students with different learning styles.² Educational and academic attainment among the students covers the broad spectrum of aspects including the objectives, goals, instructional approaches, learning management skills and specific learning styles.⁶ Learning styles of nursing students determine how he/she understands the information and how it works for the students and the facilitators.⁷ Students' Learning styles and its association with academic performance has been a growing area of research in nursing education.⁸ Previous literature has shown inconsistent findings of reflecting the association of learning styles with the academic performance in different disciplines.¹³ Further the learning styles have not been evaluated frequently for its relationship with academic performance in the context of nursing students in Pakistan.¹⁴ Therefore this study has been designed to identify pattern of learning styles its association with academic performance among nursing students in selected nursing colleges.

MATERIAL AND METHODS

An analytical cross-sectional study was conducted in four of the selected Nursing Colleges affiliated with Khyber Medical University Peshawar. The study setting was Institute of Nursing Sciences, Khyber Medical University, Post Graduate Nursing College Peshawar, Northwest College of Nursing and Rufaida College of Nursing Peshawar. The data were collected during July to September 2019. Assuming with the confidence interval of 95%, anticipated population 0.50 with 0.05 of study power and total population 327, the sample size was calculated as 177. Convenient sampling technique was used to include the participants in

the study. Students were included from second semester of studies in two of the baccalaureate programs including Generic B.Sc Nursing and Post RN-B.Sc Nursing. Students awaited with results and unwilling to participate were excluded. Validated VARK questionnaire having reliability of ($\alpha=0.86$) was used as a diagnostic tool. The questionnaire had 16 items that categorized the learners (students) into four different learning styles namely: Visual and Aural, Read/write and Kinesthetic. Academic performance in terms of GPAs/grading system (i.e. A+, A, B+, B, C+, and C) was taken as per the university Criteria. Data were analyzed using software SPSS version 20. Mean and standard Deviation were used for continues data like age, marks obtained. Frequencies and percentages were calculated for categorical data like; gender, college name, grade achievements. Chi square test was applied for comparing the frequency of grade achievements. ANOVA was applied to compare mean marks obtained among students with different learning styles where p-value <0.05 was considered as significant.

RESULTS

Demographics

A total of 177 sampled subjects with mean age of 23.9 ± 5.515 (ranged from 17-50 years) were the participants of the study. Majority 117(66.1%) of participants were female while 60(33.9%) were male students. Findings of the study indicated that majority 56 (31.6%) of students from both the undergraduate nursing programs had kinesthetic learning styles followed by read & write 38(21.5%), multimodal 30 (16.9%), Visual 27(15.3%) and aural 26(14.7%) styles of learning respectively. For gender based distribution see figure 1 and for spectrum learning styles of the participants see figure 2.

Comparison of Academic Outcomes among Students to their Learning Styles

The analysis with ANOVA test reflected that highest mean scores (marks) were obtained by group who followed Visual and Kinesthetic learning styles while Read and Write and aural styles were found least effective. These differences were statistically significant ($p=0.023$) as shown in *table 1*. Similarly, the mean percent of marks obtained by the students also indicated that Visual and kinesthetic learning styles were

effective accounting for significant difference ($p=0.032$) and the same trends was found when it was computed and compared with the Grade Point Average (GPA) ($p=0.022$). For comparison of Academic Outcomes among Students to their Learning Styles see table 1.

Comparison of Academic Outcomes among Generic BSN Students

Analysis further showed that when the academic outcomes were compared among the Generic students, a significant difference ($p<0.05$) was found among the students with the means scores of their marks. The mean obtained score of kinesthetic and visual groups were high as compared to students with other styles. Similarly, the percentages of obtained marks also indicated that students with above mentioned two learning styles (Visual and Kinesthetic) had high scores as compared to students with other learning styles. For comparison of Academic Outcomes among Generic BSN Students ($n=99$) see table 2.

Comparison of Academic Outcomes among Post-RN BSN Students

Analysis of academic performance of Post RN BScN with their respective learning styles showed that there were differences in mean obtained marks, but these differences were not statistically significant ($p>0.05$). Though the highest marks were recorded among students with Visual and kinesthetic styles however these were not significant with a ($p=0.64$). Similar findings were found for average obtained percentages and Grade Point Average respectively with a ($p=0.45$). For Comparison of Academic Outcomes among Post-RN BScN Students ($n=78$) see table 3.

Comparing Grades of Students with Respect to Their Learning Styles

The comparative analysis of grade achievement and learning styles showed that among visual nature of learning style majority 5(18.5%) of the students had "A" grade followed by 12(44.4%) "B+" grade. Similarly, students from Aural styles 9 (34.6%) had "B" grade and 6(23.1%) C+ respectively. Among students with read and write learning styles 9(23.7%) had "A" grade while 8(21.1%) scored "B" grade. Kinesthetic was found more effective as 14(25.0%) among them had A-grade followed by 14(25.0%) B-grade and 14(25.0%) "B+" and 9(16.1%) had "C+" grade. Furthermore, the analysis reflected that majority 10(33.3%) of multimodal students had C+ while 6(20.0%) had B+ grades respectively. All the grades analysis in

comparison to learning styles showed statistically significant differences with a p value of (p=0.029). For Comparing Grades of Students with Respect to Their Learning Styles see table 4.

DISCUSSION

Spectrum of Learning Styles among sampled population reflected that majority 56 (31.6%) of students from both the undergraduate programs had kinesthetic learning styles followed by read & write styles with 38(21.5%), multimodal 30 (16.9%), Visual 27(15.3%) and aural 26(14.7%) respectively. In comparison to these findings a study has been conducted among BDS students. Kinesthetic was the dominant learning style among the students. Kinesthetic learning style with 30.1 % followed by 22.6% with visual style whereas multimodal was concluded with 19.9% with the study findings.¹⁰ A study conducted among pre-medical students, showed highest proportion where 33.8% of the study participants had read and write followed by 32.5% with Kinesthetic styles.¹¹ Another study conducted among medical students revealed that majority (46.2%) had multimodal, followed by visual 24.1% and auditory 17.5% where kinesthetic nature of learning style was reported by 11.8% of medical students.¹² Further another literature among nursing students reflected that 27.5% of nursing student had Kinesthetic style and similar proportion had auditory while 13.7% and 11.8% had read & write and Visual styles respectively where multimodal were found among 19.6% of the nursing students. All of these findings were found consistent to our study conducted however the sample size of the reference studies were found less in comparison.¹⁴ Furthermore; the trends of learning styles in the study conducted showed that kinesthetic learning styles followed by read & write multimodal, Visual, and aural were the sequential preferred styles respectively. Studies among students in China have also shown the same trend that kinesthetic learning style was found among majority of students followed by aural and visual styles. In contrast a study from Saudi Arabia have indicated that most (two third) of the staff nurses had multimodal nature of learning. Studies from Scotland have reflected that majority 76(53%) of nurses had visual learning

style.^{15, 16}

Furthermore, comparison of preferred teaching among nursing students indicated that 80(42.2%) of students were preferring conventional teaching approach and 97(54.8%) were of the view that they like to be thought owing facilitator and suggested to be the part of contemporary modes of learning. Students centered or contemporary approach has been appreciated by other studies as well.¹⁷

Analysis of the data further reflected that comparison of academic outcomes among nursing students with different learning styles indicated that highest mean score (marks) was obtained by group who followed Visual and Kinesthetic learning styles followed by Read and Write whereas aural styles were found least effective. These differences were statistically significant (p=0.023). Similarly, the mean percent of marks obtained by the students also indicated that Visual and kinesthetic learning styles were effective accounting for significant difference (p=0.032) and the same trend was found when Grade Point Average (GPA) was compared (p=0.022). In comparison a study conducted on dental students in Iran revealed that the common learning style was multimodal followed by aural and kinesthetic and showed significant association of learning styles with academic achievement however it was noted that reading and writing were the preferred styles towards better academic performance.¹⁸ The methodological differences were there among the given literature and current study findings however these differences may be further based on the educational methodologies, leaning atmosphere, academic facilities and courses of studies in the settings where the studies were conducted. Some of the other literature and studies have shown the same level of association established among nursing students.^{19, 20}

CONCLUSION

Learning styles play a vital role in the retention of the concepts as well students can perform better in their academic activities if teaching would be planned according to the preferred learning styles of the students. The current study findings concluded that Kinesthetic and Visual learning styles were found as the most common preferred learning styles as compared to the read and write styles among nursing students. Furthermore, it was found that there was a significant association between academic performances and learning styles of the students

therefore the instructional methods could be planned accordingly to have better outcome in learning as well as in the academic performance of the students. Certain limitations were found to conduct the study. The study was confined only to 4 of the institutes based on the approval and availability of the students. Finances and study program requirements were one of the major limitations to complete the study in 6 months duration. Access to the examination department for the results was another limitation to conclude the study on larger sample size.

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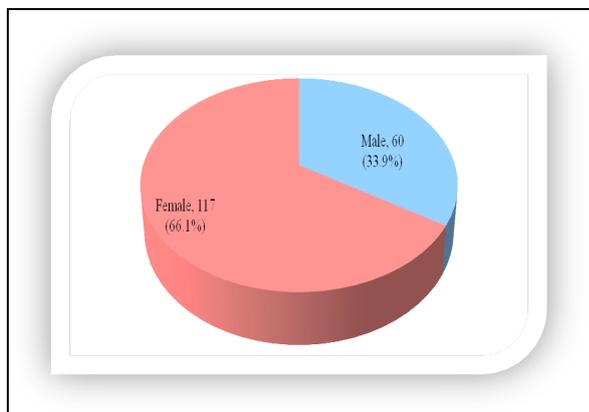


Figure 1: Gender Based Distribution of Participants

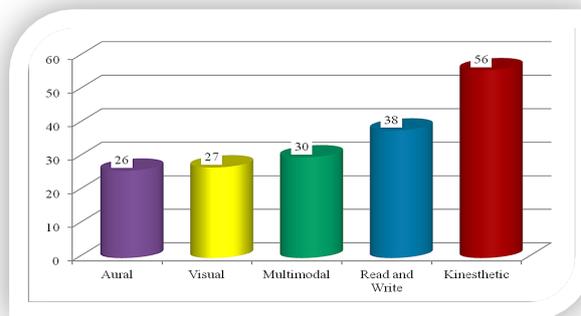


Figure 2: Spectrum of Learning Styles among Nursing Students

Table 1: Comparison of Academic Outcomes among Students to their Learning Styles

Variables	Mean	Std.	95% Confidence Interval for Mean		P-Value
			Lower Bound	Upper Bound	
Marks Obtained					
Visual	478.5	61.9	454.0	503.0	0.023
Aural	449.5	75.0	419.2	479.9	
Read and Write	473.7	64.0	452.6	494.7	
Kinesthetic	477.1	58.1	461.6	492.7	
Multimodal	453.9	65.0	429.6	478.2	
Grade Point Average (GPA)					
Visual	2.94	1.0	2.5	3.3	0.022
Aural	2.23	1.1	1.7	2.7	
Read and Write	2.92	1.0	2.5	3.2	
Kinesthetic	2.96	0.9	2.7	3.2	
Multimodal	2.53	1.0	2.1	2.9	

Table 2: Comparison of Academic Outcomes among Generic BSN Students (n=99)

Variable	Mean	Std.	95% Confidence Interval		P-value
			Lower	Upper	
Marks Obtained					
Visual	443.0	56.8	411.6	474.5	0.032
Aural	422.0	76.9	381.0	463.0	
Read and Write	438.3	49.6	412.8	463.8	
Kinesthetic	454.5	51.7	436.1	472.8	
Multimodal	426.2	56.7	398.0	454.5	
Grade Point Average (GPA)					
Visual	2.667	1.3048	1.944	3.389	0.082
Aural	1.813	1.3150	1.112	2.513	
Read and Write	2.618	1.3979	1.899	3.336	
Kinesthetic	2.742	1.1328	2.341	3.144	
Multimodal	2.083	1.0744	1.549	2.618	

Table 3: Comparison of Academic Outcomes among Post-RN BScN Students (n=78)

Variable	Mean	Std.	95% Confidence Interval for Mean		P-value
			Lower Bound	Upper Bound	
Marks Obtained					
Visual	522.9	33.2	501.7	544.0	0.64
Aural	493.6	47.8	459.3	527.8	
Read and Write	502.3	60.7	474.7	530.0	
Kinesthetic	509.7	51.7	487.3	532.0	
Multimodal	495.5	55.1	460.4	530.5	
Grade Point Average (GPA)					
Visual	3.2	.4	3.0	3.5	0.45
Aural	2.9	.4	2.5	3.2	
Read and Write	3.1	.6	2.8	3.4	
Kinesthetic	3.2	.5	3.0	3.5	
Multimodal	3.2	.4	2.8	3.5	

Table 4: Comparing Grades of Students with Respect to Their Learning Styles

Learning Style	Academic Achievements in terms of Grade						P-Value
	A	B	B+	C+	C	F	
Visual	5(18.5%)	2(7.4%)	12(44.4%)	3(11.1%)	3(11.1%)	2(7.4%)	0.02
Aural	0(0.0%)	9(34.6%)	3(11.5%)	6(23.1%)	3(11.5%)	5(19.2%)	
Read and Write	9(23.7%)	8(21.1%)	8(21.1%)	7(18.4%)	3(7.9%)	3(7.9%)	
Kinesthetic	14(25.0%)	14(25.0%)	9(16.1%)	9(16.1%)	7(12.5%)	3(5.4%)	
Multimodal	02(6.7%)	4(13.3%)	6(20.0%)	10(33.3%)	5(16.7%)	3(10.0%)	