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Original Research Article

Exploring the learning preferences using Kolb's learning style inventory among undergraduate nursing students: a cross-sectional study

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ABSTRACT

Background: By identifying the predominant learning styles among undergraduate nursing students, educators can tailor instructional methods to enhance engagement, retention, and application of knowledge in both classroom and clinical settings.
Methods: A quantitative, descriptive, cross-sectional study was conducted from August to November 2023 including 150 undergraduate nursing students through convenience sampling technique. Kolb's learning style inventory was used to collect the data for identifying the preferred learning style and socio-demographic tool was used for assessing the demographic variables. Validity of tool was done by panel of seven experts and internal consistency was assessed by test-retest method. Statistical analysis was employed by SPSS version 20.
Results: The findings revealed that the majority of participants exhibited a very strong preference for the accommodating learning style (65.3%), followed by assimilating (45.3%), converging (40%), and diverging styles (31.3%). Significant associations were found between the accommodating learning style and variables such as age (p=0.04), nature of stay (p=0.04), and medium of previous education (p=0.01). The diverging learning style showed a significant association with self-study habits (p=0.04), while the assimilating style was associated with religion (p=0.02). No significant associations were observed between the converging learning style and any sociodemographic variables.
Conclusions: Nursing education should incorporate diverse teaching strategies to accommodate varied learning styles and address sociodemographic influences, thereby enhancing student engagement and academic success. Further research is recommended to explore the broader implications of these findings in different educational and cultural contexts.

Keywords: Learning, Nursing, Preferences, Students, Undergraduate

INTRODUCTION

The landscape of nursing education is rapidly transforming, driven by the increasing complexities of healthcare delivery and the diverse learning needs of students. The field of healthcare demands professionals who possess not only technical expertise but also the ability to adapt to ever-evolving clinical environments. Nursing, as a discipline, is at the forefront of this dynamic healthcare landscape, requiring its practitioners to be proficient in critical thinking, decision-making, and lifelong learning.[1]

As the healthcare system demands highly skilled and adaptive professionals, nursing education programs are tasked with equipping students with a robust combination of theoretical knowledge and practical skills.[2] However, the efficacy of teaching strategies often depends on how

well they align with students' learning preferences.[3] The exploration of these preferences, therefore, becomes a cornerstone for optimizing educational outcomes in nursing programs.[4]

Kolb's learning style inventory (LSI), based on David Kolb's experiential learning theory, offers an insightful framework for understanding how individuals prefer to learn and process information. According to Kolb, learning is a cyclical process involving four stages: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). These stages correspond to four distinct learning styles- diverging, converging, assimilating, and accommodating- that reflect an individual's approach to acquiring and applying knowledge. The relevance of Kolb's model to nursing education lies in its emphasis on experiential learning, a process that mirrors the hands-on and reflective nature of clinical practice.[5]

Understanding the diverse learning preferences of undergraduate nursing students is crucial for several reasons. Firstly, nursing students often come from varied demographic and cultural backgrounds, which influence their learning styles. Secondly, nursing curricula are inherently complex, integrating both theoretical concepts and practical training. Tailoring educational approaches to suit individual learning styles can enhance students' engagement, retention, and competency development. Thirdly, identifying learning preferences provides educators with actionable insights to design inclusive and effective teaching strategies, ultimately fostering a positive learning environment.[1]

The importance of this study lies in its potential to bridge the gap between teaching methodologies and student needs in nursing education. By exploring learning preferences through Kolb's learning style inventory, educators can gain valuable insights into the predominant styles among nursing students and their correlation with demographic factors. This knowledge can inform curriculum design and pedagogical practices, ensuring that teaching strategies not only impart knowledge but also empower students to thrive in their academic and professional journey.

Aim of the study

The aim of this study was to explore the learning preferences of undergraduate nursing students using Kolb's learning style inventory and to examine the relationship between these preferences and sociodemographic demographic variables.

The objectives of the study

The objectives of this study were to assess the preferred learning style among undergraduate nursing students. To determine the association of preferred learning style with selected sociodemographic variables.

METHODS

Study design and setting

The present study utilized a cross-sectional descriptive research design to explore and describe the preferred learning styles among nursing students. This study was carried out at MM College of Nursing, Mullana, Ambala from August to November 2023.

Study population

A total of 150 Undergraduate students from 2nd and 3rd year of the Bachelor of Science (B.Sc.) Nursing program were selected through convenience sampling technique.

Study size

A sample size of 137 participants was determined using the RaoSoft sample size calculator, ensuring statistically adequate representation of the target population. To account for potential non-responses, the sample size was increased by 10%, resulting in a total of 150 participants were included in the study.

Inclusion criteria

Students were selected based on inclusion criteria like enrolment in 2nd and 3rd year, willingness to participate, and the ability to access and complete the online form, while exclusion criteria ruled out first-year or final-year students, incomplete responses, and those with language or other communication barriers.

Ethical consideration

Ethical clearance was obtained from the institutional ethics committee, MMIMS and R with letter no. IEC-2723. In addition to this, permission was taken from principal of College of Nursing Maharishi Markandeshwar deemed to be university before data collection and participants were also briefed about the study, its importance and written informed consent was taken.

Data collection and tools

Data was collected using a Google form, with the questionnaire link shared alongside instructions and details about the study's purpose. Participants were assured of confidentiality, and written consent was obtained. Kolb's learning style inventory was the primary tool used, comprising 20 items per domain: accommodator, divergers, assimilators and convergers. Scores ranged from 0 to 20 for each domain, with detailed cutoffs to indicate preference levels from very low to very strong. A sociodemographic profile sheet was also

developed, including factors like age, gender, religion, academic year, marital status, nature of stay, area of residence, medium of previous education, self-study and type of family.

Validity and reliability

The tools were validated by a panel of seven experts, achieving a content validity index (CVI) of 0.96. Reliability, assessed through the test-retest method, yielded a coefficient of 0.88.

Statistical analysis

The raw data was entered in the master datasheet and later on analyzed using both descriptive and inferential statistics i.e., frequency and percentage distribution, mean, median, standard deviation and Chi square. Association between preferred learning style and selected sociodemographic factors was assessed using the chi square and $p<0.05$ was considered statistically significant by using SPSS version 20.

RESULTS

Demographic characteristics

Table 1 shows that 60% of the study samples were male whereas 40% participants were female, 50.7% belonged to 18-20 years age group followed by 42.7% belonged to 21-24 years age group and a small proportion i.e., only 6.7% belonged to 25-30 years. The majority of the participants were from B.Sc. Nursing 2nd year i.e. n=107 (71.3%) and rest from B.Sc. Nursing 3rd year. Majority of the participants belongs to Hindu religion (n=122) and unmarried (n=141). In terms of their nature of stay, majority of the participants (n=107) were day-scholars and belonged to rural residence (n=102) i.e., 71.3% and 68% respectively. Majority of the participants (n=122) had English medium of previous education and regularly doing self-study (n=126). 63.3% participants came from nuclear family whereas 55 (36.7%) were from joint family.

Table 1: Frequency and percentage distribution of socio-demographic variables (n=150).

Variables		Frequency (%)
Age (years)	18-20	76 (50.7)
	21-24	64 (42.7)
	25-30	10 (6.7)
Gender	Male	90 (60)
	Female	60 (40)
Academic year	B.Sc. 2nd year	107 (71.3)
	B.Sc. 3rd year	43 (28.7)
Religion	Hindu	122 (81.3)
	Muslim	7 (4.7)
	Others	21 (14)
Marital status	Unmarried	141 (94)
	Married	9 (6)
Nature of stay	Day scholar	107 (71.3)
	Hosteller	43 (28.7)
Area of residence	Rural	102 (68)
	Urban	48 (32)
Medium of previous education	English	122 (81.3)
	Hindi	28 (18.7)
Self-study	Yes	126 (84)
	No	24 (16)
Type of family	Nuclear	95 (63.3)
	Joint	55 (36.7)

Table 2: Frequency and percentage distribution of preferred learning style.

Preference	Accomodator	Divergers	Assimilators	Convergers
Very strong preference	98 (65.3)	47 (31.3)	68 (45.3)	60 (40)
Strong preference	22 (14.7)	52 (34.7)	23 (15.3)	23 (15.3)
Moderate preference	25 (16.7)	31 (20.7)	42 (28.0)	35 (23.3)
Low preference	4 (2.7)	17 (11.3)	13 (8.7)	24 (16.0)
Very low preference	1 (0.7)	3 (2.0)	4 (2.7)	8 (5.3)

Table 3: Association of accommodating as preferred learning style with selected sociodemographic variables.

Sociodemographic variables	Accommodator					df	χ^2	P value
	Very strong preference	Strong preference	Moderate preference	Low preference	Very low preference			
Age								
18-20	41	12	18	4	2	8	13.68	0.04*
21-24	49	9	5	0	0			
25-30	8	1	2	0	0			
Religion								
Hindu	81	20	17	4	1	8	10.58	0.18
Muslim	5	0	1	0	1			
Others	12	2	7	0	0			
Nature of stay								
Day scholar	68	13	21	3	1	8	16.06	0.04*
Hosteller	30	8	4	0	1			
Others	0	1	0	1	0			
Marital status								
Unmarried	90	21	25	4	2	4	2.69	0.58
Married	8	1	0	0	0			
Area of residence								
Rural	66	14	17	4	1	4	2.32	0.72
Urban	32	8	8	0	1			
Stream opted in 12th								
Medical	17	7	5	0	0	8	11.53	0.11
Nonmedical	13	7	6	0	0			
Others	68	8	14	4	2			
Medium of previous education								
English	80	21	18	2	2	4	7.22	0.01*
Hindi	18	1	7	2	0			
Self-study								
Yes	81	18	24	3	1	4	5.81	0.15
No	17	4	1	1	1			
Type of family								
Nuclear	63	14	15	2	2	4	1.48	0.86
Joint	35	8	10	2	0			
Occupation of parents								
Private	39	9	10	0	1	8	8.77	0.25
Government	25	6	8	4	0			
Others	34	7	7	0	1			

*Significant at p<0.05 level.

Preferred learning style among undergraduate nursing students

Table 2 shows that 98 (65.3%) participants had very strong preference for accommodating learning style while 52 (34.7%) participants had strong preference and 47 (31.3%) participants had very strong preference for diverging learning style. 68 (45.3%) participants had very strong preference for assimilating learning style and 60 (40%) participants had very strong preference for converging learning style.

Undergraduate nursing student's sociodemographic characteristics associated with preferred learning style

The findings of the current study revealed that there was a significant association between accommodating learning style and their sociodemographic characteristics, including age of the student (p=0.04), nature of stay (p=0.04) and medium of previous education (p=0.01) (Table 3). Also, participants had shown a significant association between diverging style and self-study (p=0.04) (Table 4).

Table 4: Association of diverging as preferred learning style with selected sociodemographic variables.

Sociodemographic variables	Divergers					df	χ^2	P value
	Very strong pref.	Strong pref.	Moderate pref.	Low pref.	Very low pref.			
Age								
18-20	21	25	19	9	3	8	5.28	0.70
21-24	24	21	10	7	1			
25-30	2	6	2	1	0			
Religion								
Hindu	37	44	26	13	3	8	7.95	0.42
Muslim	1	3	2	0	1			
Others	9	5	3	4	0			
Nature of stay								
Day scholar	34	37	23	11	1	8	11.28	0.13
Hosteller	13	15	7	6	2			
Others	0	0	1	0	1			
Marital status								
Unmarried	45	47	30	16	4	4	1.91	0.75
Married	2	5	1	1	0			
Area of residence								
Rural	28	41	20	10	3	4	5.43	0.19
Urban	19	11	11	7	1			
Stream opted in 12th								
Medical	9	10	5	4	1	8	3.23	0.92
Nonmedical	8	7	8	3	0			
Others	30	35	18	10	3			
Medium of previous education								
English	37	43	27	12	4	4	2.65	0.55
Hindi	10	9	4	5	0			
Self-study								
Yes	40	48	22	15	2	4	9.68	0.04*
No	7	4	9	2	2			
Type of family								
Nuclear	27	33	21	11	4	4	2.90	0.58
Joint	20	19	10	6	0			
Occupation of parents								
Private	19	21	13	5	1	8	10.89	0.20
Government	15	9	13	5	1			
Others	13	22	5	7	2			

*Significant at p<0.05 level

Table 5: Association of assimilating as preferred learning style with selected sociodemographic variables.

Sociodemographic variables	Assimilators					df	χ^2	P value
	Very strong preference	Strong preference	Moderate preference	Low preference	Very low preference			
Age (years)								
18-20	31	11	23	8	4	8	4.02	0.83
21-24	32	10	15	5	1			
25-30	5	2	4	0	0			
Religion								
Hindu	55	20	34	12	2	8	9.72	0.04*
Muslim	3	1	1	0	2			
Others	10	2	7	1	1			
Nature of stay								
Day scholar	46	20	28	9	3	8	11.18	0.13

Continued.

Sociodemographic variables	Assimilators					df	χ^2	P value
	Very strong preference	Strong preference	Moderate preference	Low preference	Very low preference			
Hosteller	22	3	13	4	1			
Others	0	0	1	0	1			
Marital status								
Unmarried	64	21	39	13	5	4	1.16	0.90
Married	4	2	3	0	0			
Area of Residence								
Rural	47	14	27	11	3	4	2.73	0.62
Urban	21	9	15	2	2			
Stream opted in 12th								
Medical	15	4	8	2	0			
Nonmedical	10	1	10	5	0	8	10.07	0.17
Others	43	18	24	6	5			
Medium of previous education								
English	59	16	34	10	4	4	4.04	0.33
Hindi	9	7	8	3	1			
Self-study								
Yes	56	21	36	11	3	4	3.28	0.41
No	12	2	6	2	2			
Type of family								
Nuclear	43	13	27	10	3	4	1.62	0.76
Joint	25	10	15	3	2			
Occupation of parents								
Private	31	5	18	3	2			
Government	15	9	11	6	2	8	8.02	0.40
Others	22	9	13	4	1			

*Significant at $p<0.05$ level.

Whereas there was a significant association was found between assimilating learning style with the religion of the participants (p=0.02) (Table 5). This study also shown that there was no significant association between converging learning style and sociodemographic variables of the participants.

DISCUSSION

The study provides insights into the diverse learning preferences of undergraduate nursing students and reveals significant associations with certain sociodemographic variables. The predominance of the accommodating learning style among participants (65.3% with a very strong preference) is particularly noteworthy. Accommodators thrive in settings that emphasize active experimentation and practical experiences, which are integral components of nursing education. The association between accommodating learning style and sociodemographic factors such as age, nature of stay, and medium of previous education emphasizes the impact of personal and environmental influences on learning preferences. Younger students and those with English as their medium of previous education may be more inclined toward accommodating learning due to their exposure to interactive and modern teaching methods, aligning with Kolb's experiential learning theory.[5]

The diverging learning style, characterized by reflective observation and the ability to generate ideas, showed a significant association with self-study habits. This finding aligns with study that highlight the importance of reflective practices in self-directed learning and found that nursing students who actively engaged in self-study often exhibited strong reflective tendencies, which are key characteristics of the diverging style.[6]

The assimilating learning style, which focuses on abstract conceptualization and logical reasoning, was significantly associated with religion. This may reflect the cultural and educational values tied to structured and theoretical approaches. Choi et al suggested that cultural influences play a significant role in shaping students' preferences for certain learning styles, particularly assimilative approaches that emphasize systematic reasoning and understanding.[7]

Interestingly, no significant association was found between the converging learning style and sociodemographic variables. This contrasts with some studies that suggest problem-solving preferences may be influenced by factors such as age, educational background, or learning environment.[8] The lack of association observed in this study may be attributed to the universal importance of problem-solving skills in nursing

education, making this style equally relevant across all demographic groups.

The study's sociodemographic findings highlight additional factors that could influence learning preferences. For instance, the gender distribution (60% male and 40% female) may suggest differing tendencies in learning preferences due to gender-based cognitive and social differences. Previous research indicates males may lean toward pragmatic approaches, while females might favor reflective styles.[5] Age also played a role, with most participants falling into the 18-20 age group. Younger learners, who are often more adaptable and enthusiastic about hands-on learning, likely contributed to the strong preference for accommodating styles observed in this study. Educational progression also influences learning preferences, as second-year students dominated the sample and may favor experiential learning due to the practical focus of early nursing education.

Additionally, the study highlighted other sociodemographic characteristics, such as the predominance of day-scholars (71.3%) and participants from rural areas (68%). These factors may influence access to resources and learning environments, shaping reliance on accommodating and diverging styles. Most participants came from nuclear families (63.3%), which could encourage independence and adaptability in learning. Similarly, the significant association between English medium education and accommodating style suggests exposure to interactive teaching methods that align with active experimentation.[9]

Overall, the findings align with Kolb's experiential learning theory and other studies emphasizing the role of personal and environmental factors in shaping learning preferences.[5-7] However, the lack of association between converging style and sociodemographic variables contrasts with studies suggesting links between problem-solving approaches and demographic factors.[8] This discrepancy highlights the need for further research to explore the universal applicability of the converging style in nursing education.

To optimize nursing education and cater to the diverse learning preferences identified in this study, it is essential to design curricula that integrate varied teaching methodologies aligned with Kolb's learning styles.[5] For students demonstrating a strong inclination toward accommodating learning, active experiential approaches such as clinical simulations, skill-based workshops, and practical demonstrations should be prioritized. Additionally, reflective discussions and observational activities should be embedded into the curriculum to cater to students favouring the diverging learning style, promoting self-directed learning and critical analysis. For those with preferences for assimilating learning, a structured framework emphasizing theoretical models, logical reasoning tasks, and systematic instruction should be implemented to support abstract conceptualization. Faculty development programs must focus on enabling educators to identify and adapt to the specific learning needs of their students, fostering inclusivity and enhancing the effectiveness of pedagogical approaches.[10] Institutions should also consider sociodemographic factors highlighted in the study when devising personalized interventions- for example, addressing the unique challenges faced by day-scholars, students residing in rural areas, or learners from diverse cultural and linguistic backgrounds.

The study has several limitations that must be acknowledged. The sample included only second- and third-year B.Sc. nursing students from a single institution, limiting the generalizability of the findings to a broader population. Also, the self-reported data introduced potential biases, such as social desirability or recall bias, which might affect accuracy. These limitations underscore the need for broader and longitudinal research to gain more robust insights into nursing students' learning preferences.

CONCLUSION

The study provided valuable insights into the learning preferences of undergraduate nursing students and their relationship with sociodemographic variables. The findings highlight the importance of accommodating diverse learning styles in nursing education to enhance student engagement and academic performance. The significant associations observed between certain learning styles and sociodemographic factors underscore the need for personalized teaching strategies that consider students' backgrounds and preferences.

Recommendations

Furthermore, empirical research is needed to examine the efficacy of these tailored strategies in improving academic outcomes. Such efforts would ensure that nursing education remains responsive to the multifaceted needs of its student population and aligns with the dynamic demands of the healthcare profession.

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