

A Study to Assess the Effect of Mnemonics and Chunking on Memory of the Undergraduate Nursing Students Studying in the Selected Colleges of Punjab

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ABSTRACT

Introduction: The memory demands of nursing students are significantly greater than those of working adults. One of the most frequently mentioned issues among students is the difficulty in retaining large volumes of academic content. Effective and efficient memory is critical for a student's success. In every work that we do and every form of communication, we rely completely on the memory of past experiences, conversations, information and skills. It is also the most fundamental aspect of the teaching-learning process. In this study, the researcher aimed to determine whether mnemonics and chunking, a popular widely used memorizing technique, can enhance memory among undergraduate nursing students.

Aim: This study aimed to evaluate the effectiveness of mnemonics and chunking interventions on the memory of undergraduate nursing students in selected colleges in Punjab.

Methods: A quasi-experimental study was conducted with 100 undergraduate nursing students at selected colleges in Punjab. Participants were assigned to either an experimental group or a waitlist control group using a simple random sampling technique. The experimental group received a 1-and-a-half-hour mnemonics and chunking intervention for one day. Measurements were taken at pre-test (day 1), post-test (day 3), follow-up 1 (7 days later), and follow-up 2 (1 month later). A self-structured memory questionnaire was used to assess memory. Data analysis was carried out using descriptive and inferential statistics.

Results: There was a significant difference in the mean post-test memory scores between the experimental group (M = 21.80, SD = 5.16) compared to the waitlist control group (M = 15.90, SD = 4.56), $p < 0.05$.

Conclusion: The mnemonics and chunking intervention proved effective in enhancing memory among undergraduate nursing students at selected colleges in Punjab.

Keywords: Memory, undergraduate nursing students, mnemonics and chunking, nursing.

Introduction

The memory demands on students are markedly greater than on working adults. A component of

the most frequently mentioned issues among students is the difficulty in retaining large volumes of academic content. Effective and

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efficient memory is crucial for student success. In every task and form of communication, we rely heavily on our memory of past experiences, conversations, information, and skills. Memory is furthermore a fundamental facet of the teaching and learning process.¹

Memory is crucial for a student's ability to learn, achieve academic success, and develop essential life skills. It supports the acquisition and application of knowledge, helps in managing academic tasks, fosters social interactions, and contributes to overall cognitive and emotional development. Students can improve their educational outcomes by enhancing their memory skills and better prepare for future challenges.²

Mnemonics and chunking are crucial for nursing students because these techniques enhance memory retention and recall, vital to their academic success and professional competence. Nursing students are expected to master a vast amount of complex information, including medical terminologies, procedures, pharmacology, and patient care protocols.³

Effective use of mnemonics and chunking can improve critical thinking and decision-making skills. By quickly recalling essential information, nursing students can make knowledgeable judgments in clinical settings, which is vital for patient safety and care. The nursing curriculum is rigorous, and students often confront high levels of stress. Mnemonics and chunking reduce cognitive load by breaking down information into manageable chunks, which can decrease anxiety and improve confidence in their knowledge and abilities.⁴

In nursing, syllabi and content result in students being not able to remember each and everything so perfectly. In nursing, the curriculum is very complex. More focus is on the theory part. Numerous proven techniques are employed in nursing education to learn. For example, demonstration method, role play and lecture method, but still students didn't benefit from it and were not able to do patient care properly and possibly lose marks in the examination. If memorization is the doorway to all mental and physical activities, it should be learned

systematically. There are diverse approaches through which this is possible but Mnemonics and Chunking are the most effective techniques to memorize an ample amount of information.⁵

Methodology

The study design was Quasi-Experimental (pre-test post-test research design) that was conducted among Bsc Nursing first semester students of selected colleges of Punjab. The study was conducted between January 2024 - April 2024. Ethical clearance and approval were taken from Institutional Ethics committee (IEC) Chitkara University, Punjab to conduct the research study. Approval No: EC/NEW/INST/ 2023/531/203 on 20 May 2023. Written permission was obtained from heads of selected nursing colleges. Written informed consent was taken from the participants for the study. Subjects were eligible for the trial if they met the following Inclusion and exclusion criteria.

This study included students who were, willing to participate in the study, present on the day of data collection. This study excluded students who were, suffering from any diagnosed mental disorder, absent on the day of data collection.

Intervention:

Intervention included the administration of a teaching program using Mnemonics and Chunking on Cranial and Spinal nerves by the researcher for one and a half an hour. The content of Intervention included, components of Cranial and Spinal nerves intervention with description.

Outcomes:

The primary outcome variable was to find the effect of Mnemonics and Chunking Teaching Intervention on Memory among the study population. Second outcome included to find the association between memory and selected demographic variables of undergraduate nursing students.

Sample size:

Sample size was calculated using power analysis using Cohen's d formula

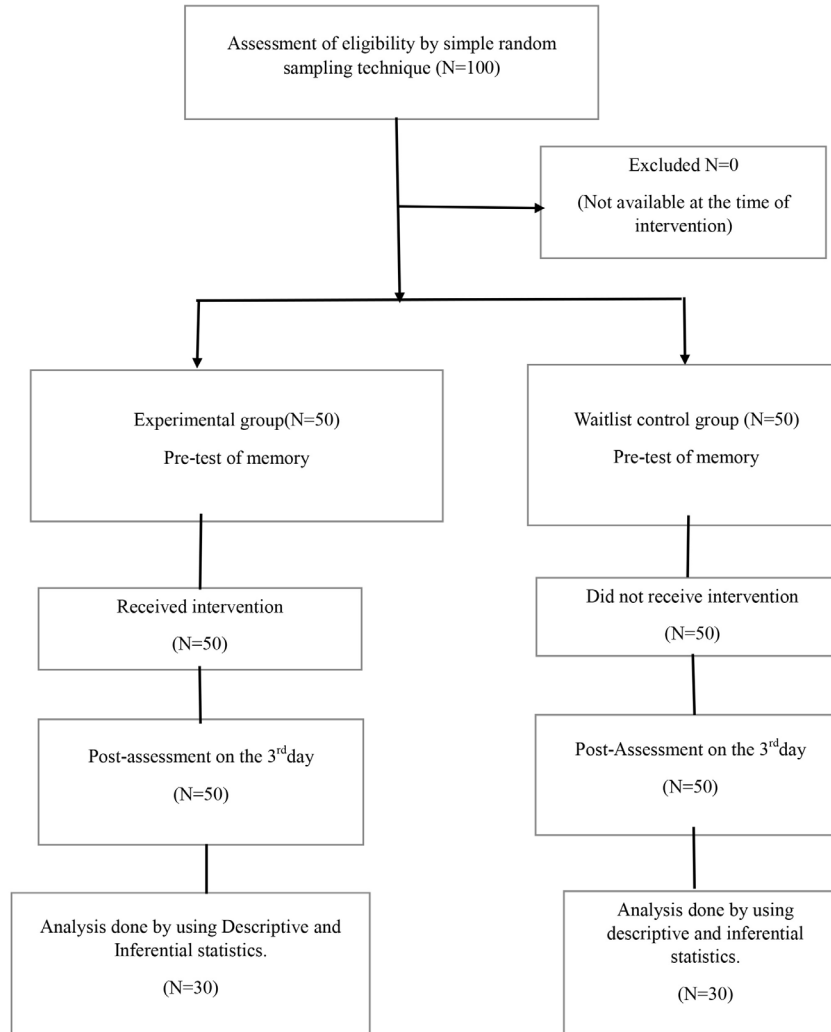


Fig. 1: Consort Diagram

The sample consisted of 100 First-semester BSc Nursing students distributed equally in experimental and waitlist control groups. (Table 1)

For all variables except gender, the value of chi-square was found non-significant at $p < 0.05$ hence both groups were considered homogeneous.

Section-II: Findings related to assessment and comparison of pre-test, post-test and follow-up scores of memory in the experimental and waitlist control group (Table 2 and 3).

The difference between the pre-test and post-test memory scores of the experimental group was found significant at $p < 0.05$ level. Hence, alternate hypothesis H_1 : There will be a significant difference between the mean pre-test and post-test memory scores of undergraduate nursing

students in the experimental group at $p < 0.05$ was accepted.

The difference between the pre-test and post-test memory scores in the experimental group and waitlist control group was found significant at $p < 0.05$ level. Hence, alternate hypothesis H_2 : There will be a significant difference in the mean pre-test and post-test memory score of undergraduate nursing students in the experimental and waitlist control group at $p < 0.05$ was accepted (Table 4).

The difference within pre-test, post-test and follow-up memory scores in the experimental group was found statistically significant at $p < 0.05$ level.

The difference within pre-test, post-test and follow-up memory scores in the waitlist control group was found statistically non-significant at $p < 0.05$ level (Table 5).

Table 1: Frequency and percentage distribution of study subject's demographic characteristics.

N= 100

S. No.	Demographic Variables	Experimental. Group		Control. Group		df	χ ²	p-value
		n	%	n	%			
1.	Age (years)							
	17-19	44	88.0	42	84.0	1	5.86	.044
	20-22	6	12.0	8	16.0			
2.	Gender							
	Male	24	48.0	20	40.0	1	13.67	.000
	Female	26	52.0	30	60.0			
3.	Area of residence							
	PG	16	32.0	11	22.0	3	2.42	.488
	Hostel	22	44.0	22	44.0			
	Home	8	16.0	10	20.0			
	Others	4	8.0	7	17.0			
4.	Ongoing substance abuse							
	Yes	0	0.0	0	0.0	NA	NA	NA
	No	50	100.0	50	100.0			
5.	Result of last year							
	50-60%	3	6.0	5	10.0	4	4.79	.309
	61-70%	9	18.0	7	14.0			
	71-80%	28	56.0	32	64.0			
	81-90%	7	14.0	5	10.0			
	>90%	3	6.0	1	2.0			
6.	Hours of screen time per day							
	Less than 3 hrs.	15	30.0	12	24.0	2	2.29	.318
	3-5 hrs.	24	48.0	30	60.0			
	More than 5 hrs.	11	22.0	8	16.0			
7.	Hours spend on self-studying per day							
	Less than 1 hr.	5	10.0	8	16.0	2	.809	.667
	1-2 hrs.	26	52.0	29	58.0			
	3-4 hrs.	17	34.0	13	26.0			
	4-6 hrs.	2	4.0	0	0.0			

Table 2: Frequency and percentage distribution of pre-test and post-test memory scores among 1st-semester nursing students in experimental and waitlist control groups.

N=100

Perceived memory category	Score	Experimental group		Waitlist control group	
		Pre-test	Post-test	Pre-test	Post-test
		Frequency percentage (%)	Frequency percentage (%)	Frequency percentage (%)	Frequency percentage (%)
Inadequate	0-12	10 (20.0)	0	12 (24.0)	10 (28.0)
Moderate	13-24	40 (80.0)	32 (64.0)	37 (74.0)	39 (70.0)
Adequate	25-38	0	18 (36.0)	1 (2.0)	1 (2.0)

Minimum score- 0 – Maximum score- 38

Table 3: Comparison of mean pre-test and post-test memory scores of students in the experimental group and waitlist control group.

N= 100

Memory Score									
Group	n	Pre-test			Post-test			Within the group Wilcoxon test	p-value
		Mean Rank	Mean	SD	Mean Rank	Mean	SD		
Experimental Group	50	22.54	15.94	3.52	7.08	21.80	5.16	-5.6	.000
Waitlist Control Group	50	28.71	15.76	4.47	26.99	15.90	4.56	- .50	.617

Significant (p≤0.05) Significance (p≥0.05)

Table 4: Comparison of mean memory scores of Experimental, Waitlist control group, Follow-Up 1 and Follow-Up 2.

N= 100

	Pre-Test		Post-Test		Follow-Up 1		Follow-Up 2		Friedmann test	p-value
	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean		
Experimental Group	3.8	18.3	7.5	21.8	6.2	19.5	4.3	17.1	144.0	.000
Waitlist Control Group	3.6	15.7	4.0	15.9	3.8	15.8	3.3	15.6	4.24	.236
Mann U	1167.5		494.0		700.5		987.5			
p value	.568		.000		.000		.069			

Significant (p≤0.05) ignificance (p≥0.05)

Post hoc test using 2-way Anova revealed that the difference in the pre-test with the follow-up 1 memory score of 1st-semester students in the experimental group was found statistically significant.

Section-III: Findings related to the association of post-test memory scores among 1st-semester nursing students in the experimental and waitlist control group with selected demographic variables (Table 6).

Table 5: Post hoc showing a post-test comparison of mean post-test memory scores of undergraduate nursing students in the experimental group

Group	Category	Mean difference	Standard Error	p-value
Experimental group	Pretest vs Follow up 1	.985	.183	.000
	Pretest vs Follow-up 2	.235	.183	1.000
	Posttest vs Follow-up 1	.535	.183	.020
	Posttest vs Follow-up 2	1.28	.183	.000
	Pretest vs Posttest	1.52	.183	.000
	Follow-up 1 vs Follow-up 2	.750	.183	.000

Significant (p≤0.05) Significance (p≥0.05)

Table 6: Association of demographic variables with post-test memory scores in the experimental group.

Sr. no.	Demographic Variables	Experimental Group				Waitlist Control Group			
		Mean Rank	df	u/KWt	P Value	Mean Rank	df	u/KWt	p Value
01	Age								
1.1	17-19	50.68	1	114.0	.61	30.36	1	126.0	.87
1.2	20-22	49.39				32.50			
02	Gender								
2.1	Male	24.54	1	289.0	.65	26.25		294.0	.72
2.2	Female	26.38				24.81			
03	Area of residence								
3.1	PG	28.28	3	.909	.823	27.97	3	1.023	.796
3.2	Hostel	24.30				24.20			
3.3	Home	23.50				22.94			
3.4	Others	25.0				27.88			
04	Ongoing substance abuse								
4.1	Yes								
4.2	No	NA			NA	NA			NA
05	Result of last year								
5.1	50-60%	17.50	4	13.5	.071	24.17	4	1.9	.749
5.2	61-70%	33.83				30.50			
5.3	71-80%	20.14				24.68			
5.4	81-90%	38.43				21.50			
5.5	>90%	28.33				28.83			
06	Hours of screen time per day								
6.1	Less than 3 hours	28.63	2	1.018	.601	28.53	2	4.018	.134
6.2	3-5 hours	24.04				27.06			
6.3	More than 5 hours	24.41				17.95			

Sr. no.	Demographic Variables	Experimental Group				Waitlist Control Group			
		Mean Rank	df	u/KWt	P Value	Mean Rank	df	u/KWt	p Value
07	Hours spend on self-studying per day								
7.1	Less than 1 hour	25.50	3	2.874	.412	26.20	3	1.259	.739
7.2	1-2 hours	22.50				24.92			
7.3	3-4 hours	30.12				27.32			
7.4	5-6 hours	25.25				15.75			

Significant ($p \leq 0.05$) Significance ($p \geq 0.05$)

Major findings of the study

Demographic variables

- More than half of the participants in the experimental group, 88% were in the age group of 17-19 years. While in the waitlist control group, more than half of the participants were in the age group of 17-19 years.
- In both groups nearly half of the participants were staying in hostels in the experimental and waitlist control group respectively.
- In both groups all the participants in the experimental group and waitlist control group were not having history of substance abuse.

Association of post-test memory scores among 1st-semester nursing students in the experimental group and waitlist control group with selected demographic variables.

- Association of post-test memory score with the selected demographic variables in the experimental group were statistically non-significant.
- Association of post-test memory score with the selected demographic variables in the Waitlist control group were statistically non-significant.

Discussion

Demographic characteristics

In the present study total of 100 subjects were selected and assigned to the experimental and waitlist control group. The Majority of the subjects were between the age group of 17-19

years. These findings align with the previous study by **K Jayaprakash et al's (2020)** where 67% of students were in the age group of 17-19 years.⁶

In the present study, more than half 52.0% of 1st-semester nursing students were females compared to 48.0% of males in the experimental group. In the waitlist control group 60.0% were females compared to 40% males. Contrary results were reported by **K Prabjot (2022)** which had 87% females and 14% males.⁷

In the experimental group, more than half 56% had scored marks in the range of 71-80% in their last class while in the waitlist control group, 64% had scored marks in the range of 71-80% in their last class. This is contradictory to the findings of **K Prabjot (2022)** where only 24% of students had scored above 71-80% in their last classes.⁷

To assess and compare pre-test, post-test and follow-up scores of memory among 1st-semester nursing students in the experimental and waitlist control group.

In the present study, according to pre-test results, in the experimental group most of the participants, 80% had moderate memory, and 20% had inadequate memory. In the waitlist control group, 74% had moderate memory. After post-test results, it was revealed that in the experimental group the adequate memory score was 36%, moderate memory score 64%. In the waitlist control group 74% had moderate memory, 24% had inadequate memory and 2%

had adequate memory score. A research study by **K Jayaprakash et al's (2020)** supports the above findings that students' memory levels improved from inadequate to adequate significantly in the experimental group.⁶

In the present study, the mean pre-test and post-test memory scores in the experimental group were 18.38, and 21.80 respectively. The difference between the pre-test and post-test memory scores of the experimental was found significant at $p < 0.05$ level. Hence, alternate hypothesis H_1 : There will be a significant difference between the mean post-test memory score of undergraduate nursing students in the experimental group at $p < 0.05$ was accepted. Research by **R Subraja et al's (2020)** supports the above findings that in the experimental group mean memory scores of pre-test and post-test were 16.93, and 20.18 respectively which is found statistically significant.⁸

The difference between the pre-test and post-test memory scores in the experimental group and waitlist control group was found significant at $p < 0.05$ level. Hence, alternate hypothesis H_2 : There will be a significant difference in the mean pre-test and post-test memory score of undergraduate nursing students in the experimental and waitlist control group at $p < 0.05$ was accepted. Research by **K Jayaprakash et al's (2020)** supports the above finding that the difference in pre-test and post-test memory scores between the experimental and waitlist control group was found statistically significant.⁶

Conclusion And Recommendations

Limitations

Due to the time constraint, the intervention was given for only 1 and ½ an hour, though the literature supported this evidence but, can be extended over a longer period to increase the beneficence of mnemonics and chunking.

Conclusion

The mnemonics and chunking intervention was effective in enhancing memory among 1st-semester nursing students and findings were

found significant in the experimental group and between the experimental and waitlist control group.

Nursing implications

The findings of the study have the following implications in the areas of nursing education, nursing practice, nursing administration as well as nursing research.

Nursing Education

The present study implies the need for improving methods of teaching in selected colleges of Punjab. Enhanced teaching techniques incorporating mnemonics and chunking techniques in nursing curricula can improve students' retention of complex medical information.

Nursing Practice

The implications of mnemonics and chunking in nursing practice are significant, as these techniques can enhance learning, memory retention, and efficiency in various aspects of patient care like medication administration, documentation, patient education and continuing education.

Nursing Research

By incorporating mnemonics and chunking into nursing research practices, researchers can improve data collection, analysis, memory retention, communication of findings, education, evidence-based practice, and quality improvement efforts in the field of nursing.

Recommendations

In context with the present study, the following recommendations have been made for further studies given below as follows:

- A comparable study on a large sample size can be replicated.
- RCT can be done to check the efficacy of Mnemonics and Chunking in improving memory among students.
- A Study can be conducted with other interventions like using video-based teaching or programs related to Mnemonics and Chunking and using other techniques like mind mapping.

- Further studies need to be conducted in the other remote or rural Colleges of Punjab, to get an overall view of the level of memory and information regarding Mnemonics and Chunking among students and teaching faculty.

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