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Comparative Effectiveness of Bangla and English Language Mnemonics in Short Term Memorization of Anatomical Information by Bengali Medical Undergraduates

Akhter N¹, Nahar S², Masum MM³, Shamim KM⁴

Abstract

Background: Use of mnemonics can assist to learn anatomical information more quickly and native language always positively stimulates learning. **Objective:** The study aimed to explore the effectiveness of Bangla and English language mnemonics in short term memorization by the Bangladeshi medical undergraduates. **Method:** A total of 93 first-year Bangladeshi medical undergraduates of a public medical college of Dhaka city were selected by convenient sampling and divided into three groups (Bangla, English and Control). They were instructed to follow the guidelines given at the beginning regarding use of mnemonics on their assigned groups. After half an hour an assessment was taken. **Result:** Use of Bangla was found significantly more effective than English. Both Bangla and English language mnemonics were significantly more effective than control group where no mnemonics were used. **Conclusion:** Mnemonics can help to reduce cognitive loads of the learners in short time memorization in irrespective of its linguistic expression.

Keywords: Mnemonics, Native language, Memorization, Anatomy

1. Dr. Najnin Akhter, Assistant Professor, Department of Anatomy, Bangladesh Medical University, Shahbagh, Dhaka. Contact no. +880 1684-397579.
Orchid Id: <https://orcid.org/0000-0002-5560-849X>
2. Dr. Sabekun Nahar, Assistant Professor, Department of Anatomy, National Institute of Burn & Plastic Surgery, Dhaka. Contact no. +8801716069691
Orchid Id: <https://orcid.org/0009-0009-9914-2300>
3. Dr. Md. Mohiuddin Masum, Assistant Professor, Department of Anatomy, Bangladesh Medical University, Shahbagh, Dhaka. Contact no. +880 1670-884560.
Orchid Id: <https://orcid.org/0000-0001-5103-6933>
4. Prof. Dr. Khondker Manzare Shamim, Professor and Ex-Chairman, Department of Anatomy, Bangladesh Medical University, Shahbagh, Dhaka. Contact no. +880 1711-806378
Orchid Id: <https://orcid.org/0000-0001-8686-3808>

Address of correspondence: Address of Correspondence: Dr. Najnin Akhter, Assistant Professor, Department of Anatomy, Bangladesh Medical University, Shahbagh, Dhaka.

E-mail: dr.najninakhter@bsmmu.edu.bd **Contact number:** +8801684397579, +8801318535332

Introduction

To enhance retention and retrieval of complex anatomical knowledge, the medical undergraduates often use different memory aids, or mnemonics¹. By chunking

information, creating meaningful patterns, and leveraging linguistic cues mnemonics function to modulate effective retrieval of information². The goal of using memory aids are to encode information with the

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purpose of making it memorable³. Human brain is used to easily retrieve the information which linked together rather than abstract or impersonal information and the ultimate goal of anatomy education is to build durable, accessible knowledge that supports clinical reasoning in later part of the medical undergraduate⁴. In general education sectors, the outcome of native language in teaching-learning was well established through its role to influence cognitive loads by reducing effort to learn anything in second language. The medium of language in which mnemonic cues are presented may modulate their learners whose first language aligns with the mnemonic's medium⁵.

In some part of the world where native languages predominate in early medical training, the language of instruction and study material may influence cognitive load, encoding specificity, and recall performance of undergraduates⁶. While English-language mnemonics are deeply integrated into many medical curricula worldwide, vernacular-language mnemonics have the potential to reduce extraneous cognitive load, improve initial encoding, and facilitate rapid retrieval for

students who are more proficient in their regional language⁷.

Short-term memorization grasping essential anatomical facts within a limited time frame poses a distinct challenge from long-term retention, requiring strategies that optimize initial encoding and quick recall under exam-like conditions⁸. Bengali-speaking medical undergraduates constitute a substantial and growing cohort whose early medical education, often involves English-dominated resources. Native like Bengali mnemonics, crafted to align with students' linguistic and cultural context, may offer advantages in phonological familiarity, semantic associations, and cognitive ease, potentially translating into faster short-term memorization without compromising accuracy⁹. Conversely, English mnemonics retain benefits of linking to standard medical nomenclature and international portability, which can support broader applicability beyond regional contexts^{4,10}.

Existing literatures on language effects in mnemonic-based learning present mixed findings. Some studies suggest that native-language mnemonics enhance initial encoding and recall for domain-specific content, while others indicate equivalent

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performance across languages when learners achieve a certain proficiency level or when mnemonic quality is matched^{5,6}. However, there is a paucity of rigorously designed, controlled studies comparing Bangla and English anatomical mnemonics among Bengali medical undergraduates, particularly focusing on short-time memorization performance.

This study aims to fill that gap by evaluating the comparative effectiveness of Bangla versus English language anatomical mnemonics in a controlled short-term memorization task among Bengali medical undergraduates. Specifically, we investigated immediate recall accuracy after a short study interval, acquisition rate across repeated brief study sessions, and perceived ease of use and cognitive load associated with each mnemonic language. We hypothesized that Bangla mnemonics would yield superior immediate recall and lower cognitive load in the short-term memorization context for Bengali-speaking students, though English mnemonics might offer comparable performance given adequate familiarity. The findings have potential implications for medical education policy and curriculum design in multilingual settings demonstrating a

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measurable benefit of native-language mnemonics could inform instructional strategies, resource development, and assessment preparation, ultimately supporting more efficient learning during the critical early phases of anatomy training⁶.

Methods

A cross-sectional analytical study was conducted as a part of postgraduate MS course in the department of Anatomy, Bangladesh Medical University (BMU) from March, 2017 to February, 2018. After getting the certificate from Institutional Review Board (IRB) of BMU, one public medical college of Dhaka city was chosen by convenient sampling. The 2nd medical undergraduates who were in their initial part of 3rd term of Anatomy curriculum, specifically "Head-Neck" and "CNS & Eyeball" cards were selected as participants. The topics were chosen considering their non-exposure to those portions. Bengali spoken medical undergraduates were selected, with equal number of male and female students comprising each group.

A total of 93 Bangladeshi medical undergraduates divided into three groups:

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two mnemonics and one non-mnemonic group. The mnemonic groups consisted of Bangla and English language groups and non-mnemonic group was considered as control group. The mnemonic groups used or applied mnemonics either in Bangla (native or mother tongue of Bangladesh) or English (international language) language form. A simple random sampling technique was used to divide the medical undergraduates. Each group had 33 medical undergraduates; a short presentation was given regarding the use of mnemonics to recall anatomical information in mnemonic groups. However, the control group didn't receive any instructions and they instructed to memorize anatomical information directly. The rest, mnemonic groups were instructed to memorize anatomical information using either Bangla or English language as they were dispersed in each group. For the purpose of assessment, two types of questions were formulated- single sentence true false type and fill in the blank type. After half an hour of intervention, the assessment was taken.

ANOVA post hoc, Bonferroni version was used to compare performance of mnemonic and non-mnemonic groups and each of mnemonic groups with the control group.

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SPSS (statistical package for social science) 20 version was used for data analysis. Responses of the medical undergraduates were marked as 'correct', 'incorrect' and 'un-attempted'.

Results

The performances of the medical undergraduates of two mnemonic groups, based on language, Bangla and English in terms of their scores (number of correct-responses to the questions) were compared with non-mnemonic, control group respectively. The mean marks for Bangla were 20.4839 with a standard deviation of 0.72438, suggesting high consistency within the Bangla group and a high mean score relative to control and English group. English vs control comparison showing highly significant ($p = 0.003$) value. The English group has the same mean as Bangla in this dataset (17.2903) but a larger SD (2.51917) than Bangla, indicating more variability. The results are shown in Table 1.

The scores attained by the Bangla and English groups were significantly higher than control group. Thus, proving the effectiveness of the both mnemonic groups over control group.

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Table1: Effectiveness of Bangla and English mnemonic groups over control group

(n= 31)

Group	Score (no. of correct response)*		Comparison	Probability (p)	95% confidence interval
	Range	Mean±SD			
Bangla	19-21	20.4839±0.72438	Bangla vs Control	0.000 ^S	4.3892 to 1.9979
Control	14-21	17.2903±2.51917			
English	14-21	17.2903±2.51917	English vs Control	0.003 ^S	2.8731 to 0.4818

Note: * These scores are those attained by the undergraduates in the assessment; S: Significant (p≠ 0.05 was considered as the level of significance)

While comparing between Bangla and English mnemonic groups, the scores attained by the Bangla group was significantly higher than English group,

suggesting high consistency within the Bangla group and a high mean score relative to English group (Table 2).

Table 2: Comparing effectiveness between Bangla and English mnemonic groups

(n= 31)

Group	Score (no. of correct response)*		Comparison	Probability (p)	95% confidence interval
	Range	Mean±SD			
Bangla	19- 21	20.4839±0.72438	Bangla vs English	0.008 ^S	2.7118 to 0.3205
English	14-21	17.2903±2.51917			

Note: * These scores are those attained by the undergraduates in the assessment;

S: Significant (p≠ 0.05 was considered as the level of significance)

Discussion

This study aimed to evaluate the comparative effectiveness of Bangla versus

English anatomical mnemonics in a controlled short-term memorization task among Bengali medical undergraduates.

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We hypothesized that Bangla mnemonics yield superior immediate recall and lower cognitive load in the short-term memorization context for Bengali-speaking students, though English mnemonics may offer comparable performance given adequate familiarity. After analyzing the result, the proposed hypothesis was proven by showing a significant difference of Bangla with control ($p = 0.000$) and English ($p = 0.008$). Both Bangla and English language mnemonic groups showing statistically significant differences than control. This suggests that belonging to either language group is associated with a measurable difference in the outcome compared to control. Research conducted a prospective, controlled experiment that compared a group using memory aids against a control group taught through traditional lecture methods. The results demonstrated that students utilizing mnemonics achieved significantly higher test scores and better information retention than those in the non-intervention group. The authors conclude that these memory-enhancing strategies are highly effective for mastering the vast and complex terminology inherent in medical school curricula. Ultimately, the source Bangladesh Journal of Medical Education 2026; 17(2); Akhter et al., publisher and licensee Association for Medical Education. This is an Open Access article which permits unrestricted non-commercial use, provided the original work is properly cited.

advocates for integrating these structured mental organizations into standard teaching practices to move beyond superficial learning¹. Though that research was not showing the impact of native language on learning but reflect the effectiveness of mnemonics in medical curricula. Like ours, the mnemonic groups performed significantly better than the control group.

Using native language or mother tongue mnemonics enhances memory retention and comprehension in medical curricula, particularly for students where English is not the primary language^{7,8}. Research conducted by author about the perceptions, views and opinions of the Bangladeshi Anatomy teachers regarding the use of mnemonics, where more than half of the respondents thought that Bangla mnemonics would be more effective than English ones⁹.

Studies indicate these aids outperform standard methods in short-term recall of complex physiological and anatomical concepts. This approach proves especially relevant in non-English dominant regions like South Asia¹⁰. Mother tongue mnemonics improve understanding, retention, and verbal/written expression in

medical learning. They boost academic performance and success rates in exams by aligning with students' cognitive comfort zones. Mnemonics in general, when culturally adapted, lead to higher scores in physiological concept recall compared to lectures¹¹. A mnemonic-based text-reading method yielded mean scores of 8.4 versus 4.8 for non-mnemonic groups, with statistical significance ($p < 0.001$). Indian students perceive vernacular teaching aids as superior for memory and expression, though resource limitations exist. Globally, 55.6% of countries use mother tongue instruction in medicine, correlating with better outcomes in developed regions¹².

Conclusion

This paper explores how mnemonic devices serve as vital instructional tools to enhance memory retention and student engagement in medical education through native language. The strategies sometimes are essential for transforming passive students into active learners by connecting unfamiliar concepts to relatable cues. Application of memory aids, including acronyms, rhymes, and visual model using native language providing better results in medical education. Ultimately, the source

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suggests that creative memory systems are crucial for overcoming educational challenges and fostering the critical thinking skills necessary for national development.

Recommendations

If Bangla-related proficiency yields stronger, more consistent outcomes in the measured domain, curriculum designers might leverage Bangla-rich pedagogies or bilingual approaches to bolster performance in related skills. For English education, the significant but more variable results suggest targeted interventions to reduce variability (e.g., scaffolding, subgroup-specific supports) could yield more uniform gains. Educators and policymakers should consider aligning assessment content with language strengths while ensuring equitable opportunities across language groups.

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Disclosure

No competing interest disclosure by the authors.

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