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Original Article

Comparative Effectiveness of 'Acronym' and 'Acrostic' Mnemonics on Short Time Memorization of Anatomical Information among Bangladeshi Medical Undergraduates

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Abstract

Background: Effectiveness of different mnemonics have been established by several researches. But in the extensive domain of Anatomy, the effectiveness of using different mnemonics or memory devices like 'Acronym' and 'Acrostic' for remembering huge amounts of information were neither put in visible format nor their individual effectiveness were analyzed. **Objective:** This research aimed to evaluate the comparative effectiveness of 'Acronym' and 'Acrostic' mnemonics on short time memorization of anatomical information among Bangladeshi medical undergraduates. **Methods:** This cross-sectional analytical research was carried out in the Department of Anatomy, Bangabadhu Sheikh Mujib Medical University (BSMMU) from March, 2017 to February, 2018. Ninety three (93) first year Bangladeshi medical undergraduates of two public medical colleges of Dhaka city, Bangladesh, were selected by convenient sampling and then they were divided into three groups: 'Acronym', 'Acrostic' & 'Control' groups. A demonstration on how to use mnemonics in learning for remembering large number of anatomical information was given by a PowerPoint Presentation including total procedures of data collection. Data were collected and analyzed by ANOVA post hoc to compare effectiveness of two mnemonics over control group. **Results:** Performance of both 'Acronym' and 'Acrostic' groups were found statistically more significant (p value less than 0.05) than 'Control' group. While comparing the performance of 'Acronym' and 'Acrostic' groups, 'Acrostic' was statistically more significant than 'Acronym'. **Conclusion:** Application of mnemonics for short time memorization of anatomical information reflects better impact on retention. With proper training to teaching faculties, it could be used in future teaching-learning of recalled topics.

Keywords: *Mnemonic Techniques; Medical Undergraduates; Acronym; Acrostic, Utility*

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Introduction

Mnemonics are used to assist for improving the memory by enhancing retention of information and as an important instructional or learning strategy, different mnemonic techniques collaborate previous knowledge to novel topics that needs to be remembered.[1] It often used to encode information that provides better retrieval thus helps in teaching-learning processes.[2] Putnam (2015) mentioned that extensive application of mnemonics were not observed in the classroom irrespective of its potential to advocate a large amount of

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information.[3] For retrieval of information in clinical or emergency practice, appropriate understanding and rote learning are important but when needs to remind large number of information then never deny the role of using different memory devices or mnemonics.[4] Some of the memory champions mentioned about the use of visualization techniques and mnemonics or memory devices that enabled them to retain bulk of information or other things within a short period of time.[5] The short time memory is the potency of retaining a small quantity of information in an effective, attainable state for a short period of time that may last for few seconds to hours or days.[6] The first letter mnemonics, often known as 'Acronym' that are quit common which provides good retention of information within the brain.[7] 'Acronym' is useful to remember something in a specific sequence and 'Acrostic' is another commonly used mnemonics that assist to retain a list of unrelated words.[8] Through 'Acrostic' a meaningful sentence is formed that may or may not related to the topic but it helps in retrieval of information.[5] The Bangladeshi Anatomy teachers also shared their perceptions indicating effectiveness of 'Acronym' and 'Acrostic' mnemonics in teaching-learning where students needs to retain large numbers of information for emergency condition or during examination though a large proportion of teachers remain undecided about superiority of any one of those.[9]

Though some psychologist mentioned mnemonics as unnatural learning but they also claimed that it provide fundamental mental cues to preserve information.[10] Some evidence based process for workable memorization were lacking from most of the educational institute because when attempting to teach memorization techniques, most of the time practicing 'rote learning' rather than teaching some scientific memory devices.[11] Mnemonics have been used by the Advanced Trauma

Life Support (ATLS) training program of American College of Surgeon's mandatorily to remember some of their principles for executing activities in life saving situations.[4] To enhance the learning process, use of appropriate mnemonics could contribute for maximizing the amount of retained information within the brain thus ensures effective learning. Memory of knowledge, skills or experiences can help students to overcome challenges by incorporating mnemonic strategies.[12] Necessity of special teaching learning strategies are often useful for a subject like Anatomy, as it dealt with the huge information including structures of the human body.[13]

Effectiveness of other mnemonics: Rhyme and storytelling was established by judging their impact on teaching-learning of Anatomy.[14] But effectiveness of 'Acronym' and 'Acrostic' are not established yet in the field of Anatomy. Though the authors never agreed to claim that mnemonics or memory devices only have beneficial side because their misuse can lead to obscuring real understanding of the topics thus indirectly discourage deep learning. So the present research focused to evaluate the comparative effectiveness of 'Acronym' & 'Acrostic' mnemonics on short time memorization of information in Anatomy among Bangladeshi medical undergraduates.

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Methods

This analytical type of cross-sectional study took place in the Department of Anatomy, BSMMU, Dhaka, Bangladesh from March, 2017 to February, 2018 after clearing the necessary steps for getting certificate from Institutional Review Board (IRB). Data were collected from 1st year medical undergraduates of two public medical colleges of Dhaka city selected by convenient sampling. The students were in the beginning of 3rd term of their course curriculum so they were not exposed to the topics selected from "Head & Neck" and "Central Nervous System and Eyeball" parts (Cards).[14] Each group composed of equal number of male female and students from foreign nationals were excluded from the research.

Operational definitions:

I. Acronym: A novel word is formed by the initial letters of each word that assist to remember the information.[4]

Topic: Motor innervation of median nerve in the hand **Information:** Lumbricals (1st & 2nd) Opponens pollicis Abductor pollicis brevis and Flexor pollicis brevis (superficial head)	**Mnemonic: "LOAF"**[15]

II. Acrostic: A new sentence is created, it may be meaningfully related to the information that needs to be remembered.[4]

Topic: Names of the carpal bones (from lateral to medial) **Information:** Proximal row of carpal bones: **S**caphoid, **L**unate ,**T**riquetral, **P**isiform Distal row of carpal bones: **T**rapezium, **T**rapezoid, **C**apitate, **H**amate	**Mnemonic: "Simply Learn The Positions That The Carpals Have"**[15]

III. Control groups: Medical undergraduates who memorize the information without any mnemonics is called control group. They were provided with same sets of anatomical information and questions like other two groups.

A special type of test, the researcher termed as memory test was used to assessing the memorizing ability of medical undergraduates. However, it was designed to compare the effectiveness of 'Acronym' and 'Acrostic' and 'Control' groups for memorizing anatomical information. Same topics were addressed for all three groups. Anatomical information that only required memorizing skills were selected for the research. For each a new mnemonics ('Acronym' & 'Acrostic') were either newly constructed or collected from different sources. For assessing and comparing the effectiveness, the authors constructed 'Single sentence true-false' and 'multiple choices of two options' (in the form of fill-

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in-the-gap). A demonstration was given through power point presentation to all the Bangladeshi medical undergraduates. The 'Acronym' and 'Acrostic' groups were strictly instructed to use mnemonics to recall the information. However, the control group did not receive any mnemonic to recall, rather they directly memorize the information. Allotted time for memorization was 20 minutes with or without mnemonics and then 'memory test' was taken.

Data analyses: The response to each question from each participant was marked on the answer script ('correct', 'incorrect' and 'unattempted'). Then the 'correct' responses were entered as data into the Statistical Package for Social Science (SPSS) version 20 and different groups were compared using Bonferroni version of the ANOVA post hoc test.

Results

All ninety three (93) Bangladeshi medical undergraduates were divided into three groups: 'Control', 'Acronym' and 'Acrostic' groups. Each group was composed of 31 undergraduates of two public medical colleges of Dhaka city. The performances of the medical undergraduates of two 'mnemonics' groups 'Acronym' and 'Acrostic' in terms of their scores (number of correct-responses to the questions) were compared with 'Control' group. Both 'Acronym' and 'Acrostic' groups were significantly more effective than 'Control' group in memorizing anatomical information. The results are shown in (Table 1).

Table 1 Effectiveness of mnemonic techniques in memorizing anatomical information

Group	Score (no. of correct responses)*		Comparison	Probability (p)	Significance of difference	95% confidence interval
	Range	Mean±SD				
'Acronym'	14- 21	16.4516±2.5539				
			'Acronym' vs 'Control'	0.000	S	(-1.1584)-(-3.4222)
'Control'	14-21	18.7419±1.7160				
			'Acrostic' vs 'Control'	0.042	S	(2.2932)- (0.0294)
'Acrostic'	19-21	19.9032±0.7463				

* These scores are those attained by the undergraduates in the 'memory tests'
n (number of undergraduates in a group): 31
S: Significant (p≠ 0.05 was considered as the level of significance)

On the other hand, while comparing the effectiveness between 'Acronym' and 'Acrostic' in memory tests, 'Acrostic' was found significantly more effective than 'Acronym'. The results are shown in Table 2.

Table 2 Comparison of effectiveness between the members of mnemonic groups

Group	Score (no. of correct responses)*		Comparison	Probability (p)	Significance of difference	95% confidence interval
	Range	Mean±SD				
'Acronym'	14- 21	16.4516±2.5539				
			'Acronym' vs 'Acrostic'	0.000	S	(-2.3197)- (-4.5835)

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'Acrostic'	19- 21	19.9032±0.7463

* These scores are those attained by the undergraduates in the 'memory tests'
n (number of undergraduates in a group): 31
S: Significant (p≠ 0.05 was considered as the level of significant)

Discussion

This research aimed to evaluate the comparative effectiveness of 'Acronym' and 'Acrostic' mnemonics on short time memorization of anatomical information among Bangladeshi medical undergraduates. When comparing 'Acronym' and 'Acrostic' mnemonics with 'Control' groups, both mnemonic groups were significantly more effective than 'Control' group in memorizing anatomical information. On the other hand, while comparing the effectiveness between 'Acronym' and 'Acrostic' in memory tests, 'Acrostic' was found significantly more effective than 'Acronym'. First Letter technique often expand into a descriptive story or 'Acronym' techniques which was considered as most popular memory devices where every letter serves as a clue to the retrieval of information in a specific order.[16] As one of the popular techniques, 'Acronym' can be considered as easiest ways when it matches with a common familiar abbreviation or word irrespective of its meaningful or unmeaningful nature. More than 80% Bangladeshi Anatomy teacher were familiar with this technique and 'Acrostic' was heard of by more than 75% and 'Rhyme' by about 55%.[17] Effectiveness of other two memory devices or mnemonics like 'Rhyme' and 'Storytelling' in Anatomy were established where 'Rhyme' was found significantly more 'Storytelling' effective in memorizing anatomical information than and control group. In between 'Rhyme' and 'Storytelling', former one was significantly effective more later one.[14] That was similar to ours considering those represents other mnemonics or memory devises.

Among two mnemonics, it was the perceptions of most of the surveyed Bangladeshi Anatomy teachers- 'Acronym' (46%) and 'Acrostic' (43%) were most effective than other techniques like 'Rhyme', ''Storytelling', 'Peg-word' or others. One teacher commented that as 'Acrostic' contains words that are interesting to hear, so the student may like to use it. They also mentioned that effectiveness of particular techniques may be depend upon the topics.[9] An analytical research between 'First-letter' mnemonic/'Acronym' and 'Descriptive story' results no difference in immediate recall, a week later, the later performed better.[18] Though it was not similar with the present one but that represent effectiveness of particular techniques on short time memorization.

In learning unrelated words, First Letter mnemonic or 'Acronym' was found inferior than the control group in recalling words.[19] The authors also referred to other authors' to reports about non-significant effect of First Letter (FL) mnemonics or 'Acronym'.[15] Effectiveness of mnemonics vary from young children to the elderly in memorization. To develop creative and effective devices by educators require time

and resources. In the classroom, mnemonic devices must be used at the appropriate time in the instructional sequence to achieve their maximum effectiveness.[19]

Conclusion

Between two most common mnemonics, 'Acronym' and 'Acrostic' were comparatively more effective in memorization than 'Control' groups. Among 'Acronym' and 'Acrostic', later was found significantly more effective on short time memorization. The most simple and creative mnemonic devices usually are the most effective for teaching like 'Acronym' and 'Acrostic'.

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