

Picmonic and Mnemonic Strategies: Valuable Teaching-Learning Aids to Enhance Learning and Memory in the Subject of Pharmacology

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ABSTRACT

Introduction: Medical curricula, especially the subject content of Pharmacology is very exhaustive and as the years go by, additional drugs are bound to come into the market. It is increasingly becoming difficult for medical students to learn and memorise such vast portion. In order to facilitate student's learning and memorising, we carried out this study among the 2nd year medical students.

Material and Methods: Students were asked to devise and design innovative mnemonics and picmonics in cardiovascular system after the scheduled lectures on the said topic were taken. The students were given time period of 20 days after announcing and briefing them about the study. Pre-test and post-test on the above topics were conducted before and after the presentations respectively as surprise tests.

Results: The use of picmonics and mnemonics showed improvement in their academic performance which was statistically significant.

Conclusion: Mnemonics and picmonics improve immediate recall, delayed recall, and higher-order thinking. So this student-friendly method of learning and memorising should be ideally made more popular among the medical students.

Keywords: Academic Performance, Beneficial, Favourable, Higher Order Thinking, Innovative, Learning Strategy, Memory, Memorising Ability, Mnemonics, Picmonics, Recall, Student Friendly.

INTRODUCTION

Medical curricula, especially Pharmacology curriculum is vast and exhaustive and it includes countless drug names and innumerable drug classifications. Over a period of time, a number of newer and better drugs are being marketed, which tend to challenge the older time-tested ones. These newer drugs will continue to be added to the presently existing armamentarium of drugs. The burden of memorising all these drugs which includes newer as well as the older ones will add to the agony of an average medical student pursuing the MBBS course.

It is a challenging task even for the brightest of the students to learn and memorise such long lists of complicated drug classifications. Besides, the students face various distractions in the form of social media, like WhatsApp, Facebook, Instagram, Twitter and so on; these distractions have made the situation in academic world even more grave as regards student-learning. Thus it is a tough, tedious, and tricky task for the facilitators to channelize the student energy so as to set them going in a steadfast manner on the path of stress-free learning. Appropriate guidance and timely assistance can make the process of learning and memorising the study

content more enjoyable and easy.

Devising and designing mnemonics and picmonics may be one of the favourable learning strategies which help to arouse and sustain student interest and on the whole enhance their creativity. Many students possess creative potential that can be tapped in various ways with the objective of enhancing their academic performance. According to Oxford dictionary; mnemonic is a pattern of letters and words used as an aid to memory. The word mnemonic is obtained from Greek word "mñemón" which means mindful. Thus, it is a strategy which enhances memorising abilities and facilitates recall of information.¹ It facilitates memorising by associating known facts to unknown facts. Learning is thus facilitated as it involves advancing from known to unknown domain.² Picmonics are audio-visual mnemonics. Mnemonics and picmonics over and above enhancing memory also stimulate higher order thinking which enables students to utilize their knowledge to find solutions to various clinical situations that are presented to them in their examination question paper or to situations which they may encounter in their clinical practice in future.³

Mnemonics and picmonics hasten memorisation and decrease perplexation.² In medical education it is not enough to facilitate learning and memorising but simultaneously the learning strategy should also infuse excitement regarding gaining knowledge, generate interest in study content and enthuse the students to learn it thoroughly. The medical curriculum encompasses vast and varied content and accordingly requires innovative teaching-learning strategies to aid learning and memorising. Out of the many strategies available for learning, mnemonics and picmonics strategy is one such favourable teaching-learning strategy. It is interesting, exciting, student-friendly, and least debatable.⁴

We undertook this study in the Department of Pharmacology to facilitate and enhance learning and memory among second year medical students.

Study aimed to enable the students to develop the skill to

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How to cite this article: Lois James Samuel, Yogeeta Sushant Walke, Meural Assumption D'Mello, Laveena Vassant Bandodkar. Picmonic and mnemonic strategies: valuable teaching-learning aids to enhance learning and memory in the subject of pharmacology. International Journal of Contemporary Medical Research 2017;4(8):1680-1682.

devise picmonics and mnemonics, to evaluate/assess the efficacy of mnemonics and picmonics in enhancing memory and memorising ability and to assess improvement if any in the academic performance of the students after using these learning aids.

MATERIAL AND METHODS

The conventional, didactic, classroom lectures on pharmacology pertaining to the cardiovascular system were taken as per the lecture schedule. Ethical clearance for the study was obtained from the Institutional Ethics Committee. The study was introduced and explained to the students and their written consent was duly obtained. A pre-test was conducted for the students on the pharmacotherapy of cardiovascular system. Then the students were divided into 15 groups with 10 students in each group. Student groups randomly picked their respective topics by lots. The students were given a time period of 20 days to create an innovative mnemonic or picmonic which they presented enthusiastically to the gathering of students and faculty members on a stipulated date. A post-test was held after the presentations. Pre-test and post-test were conducted as surprise tests without any prior intimation. Feedback forms were given to the students for their valuable inputs; assessing their opinion can help us make due changes in our teaching-learning strategies. The improvement in their scores was statistically analyzed using students t test. Feedback forms were also analyzed.

The following topics were presented in the form of picmonics: ACE inhibitors, nitrates and K⁺ channel openers, calcium channel blockers, β blockers, diuretics – role in hypertension and congestive heart failure, fibrinolytics, and statins. Similarly these topics enumerated below were presented as mnemonics: angiotensin receptor blockers, digoxin, α -blockers + central sympatholytics + dopamine + dobutamine, hypertension in pregnancy + hypertensive emergency + hypertensive urgency, oral anticoagulants, parenteral anticoagulants, antiplatelets, bile acid sequestrants and fibric acid derivatives.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for the statistical analysis. Student t test was used for comparison.

RESULTS

150 students were invited to participate in this study. Out of these, 118 students completed pre-test and post-test. The improvement in their score was evaluated statistically using students t test. There was improvement in scores of 89 students (76%) while 18 students (15%) showed a decrease in their scores. There was no change in scores of 11 students (9%). Students t value was 9.87 and p value was <.05 which was statistically significant.

Results of feedback, 92% students felt that the exercise of devising and designing picmonics and mnemonics helped them to remember the topic better. The process of developing, designing and presenting picmonics and mnemonics was found to be enjoyable by 90% students. 88% students felt

that working in a group boosted team spirit. 88% students opined that they would extend the use of this technique to other topics in pharmacology as well. 89% students felt that this technique should be integrated into medical education. The students participated in the study with great fervour and formulated innovative and impressive mnemonics and picmonics. They showed unprecedented enthusiasm and interest during the presentation. The response was thus overwhelming. Those of us in the teaching faculty who observed the presentations were pleasantly surprised and enthralled by their excellent performance. Most of the picmonics and mnemonics presented by the students helped us too to remember and recollect various aspects of Pharmacology pertaining to the cardiovascular system.

DISCUSSION

The nobility and charisma associated with the medical profession beckons many students to opt for this profession as their career option. A high level of commitment and motivation is required to qualify the medical entrance examination. Their joy knows no bounds when they get enrolled into a prestigious medical college. They start their MBBS course with great zeal and ardour, supported and propelled by the great enthusiasm expectations of their parents and other family members.

The MBBS course being so extensive, challenging and gruelling, somewhere down the line some students experience the “burnt-out syndrome” as they try hard to face and complete this uphill task; thus they lose their interest and motivation to study. Besides, many vulnerable students get distracted and become disinterested. Also some students who are prone to stress may succumb to severe academic pressure leading to anxiety and depression and may ultimately drop out of the MBBS course.

Some of these students who get distracted in spite of knowing fully well that they have to study to be successful in examinations, are unable to discipline themselves into studying as the exams approach. Despite being aware of the repercussions, sometimes they are unable to fathom the vast and enormous study content. They presume that the medical course is a herculean task much beyond their own capacity and they give up in despair. In such a situation, it is imperative and in fact a duty on the part of the medical facilitator to identify these students, intervene, and show a ray of hope to such students. Thus teachers/ facilitators play a key role of a friend, philosopher and guide to channelize their energy and to reorient and redirect these students back towards academics using various interesting methods. One such method could be using interesting teaching-learning strategies like mnemonics and picmonics.

Memorising and learning are an indispensable part of medical education. Various studies on the role of mnemonics and picmonics in learning and memorising have been carried out and one needs to acknowledge the impressive results obtained in the “recall” performance aspect of student learning.⁵

Mnemonics and picmonics are techniques which can be

used to improve and facilitate learning and help memorise the MBBS course content. Many students of MBBS course are aware of these methods of learning and memorising but either they are not motivated enough to use them or they have “no-time” to make novel mnemonics and picmonics.⁶ Approach of the students towards our study was commendable and pragmatic. This study motivated them to adopt the mnemonics and picmonics strategies as two of their learning techniques.

Russel et al in a study assessed his students for immediate recall, delayed recall, and categorisation recall.⁷ The results revealed the fact that the students who used the mnemonics strategy scored much higher than the students who learnt without the mnemonics strategy; this higher score was seen in all the three above mentioned domains i.e immediate recall, delayed recall, and categorisation recall. The above study also does away the various misconceptions regarding mnemonics strategy and relieves the students of the “mnemonophobia” that may be present in their minds.

In our own study, we instructed and encouraged the students to design and devise their own original and novel mnemonics and picmonics. This enabled the students to utilize their creative skills appropriately and channelize their energy in the right direction with the aim of enhancing their academic performance especially in the examinations.

Jennifer A. Mc Cabe in her studies tried to determine whether students performed better when they designed their own keyword mnemonic as compared to those who used mnemonic given by instructors. The results for immediate and delayed quiz revealed that this generating “keyword strategy” on their own was much more effective.⁸

Aaron et al in their study assessed learning and memory using following three aspects of learning-immediate recall, delayed recall, and higher order thinking. The results of this study indicated that the students who devised and used the mnemonic strategy scored higher than their counterparts. Over and above learning and memorising MBBS course content, mnemonics and picmonics enhance and sharpen their higher order thinking skills. In medical field higher- order thinking is of utmost importance as it helps the student to correlate various aspects of a clinical case and thus facilitate the process of finding solutions for the clinical problems that they will encounter in their future clinical practice.⁹ Our tests analysed their higher order thinking as well and not merely recall from memory.

CONCLUSION

From our study and other published studies on the teaching-learning methods, it can be concluded that mnemonics and picmonics are beneficial strategies which help students to improve their learning and memorising thus improving their overall academic performance. The students remember better when they design and use their own novel and innovative mnemonics and picmonics. Use of mnemonics and picmonics also directs the students towards higher- order thinking. These strategies are thus of benefit to students of MBBS course who have to learn, memorise, recall and apply

the vast portion as laid down in the medical curriculum by the MCI. Mnemonic and picmonic strategies need to be popularised among the student community to equip them to study the relevant subject content in-depth and boost their academic performance. Thus integrating important teaching learning strategies into the medical curriculum can churn out knowledgeable, confident, and skilled doctors.

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Source of Support: Nil; **Conflict of Interest:** None
Submitted: 18-07-2017; **Accepted:** 20-08-2017; **Published:** 01-09-2017

ANNEXURE - 1	
Feedback form	
Did the exercise of devising and designing Picmonic/ Mnemonic(P/M) help you to remember the topic better?	Yes/No
Was developing, designing, presenting P/M an enjoyable process?	Yes/No
Did working in a group boost your team spirit?	Yes/No
Would you use this technique for topics other than cardiovascular system?	Yes/No
Do you think that this technique should be integrated into medical education?	Yes/No