Z to A approach as a novel and innovative method in teaching Biochemistry for 1st MBBS students

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Abstract :
Introduction: Z to A approach is an innovative technique which explains application of particular concept first and the concept itself later. It has not been used in medical education so far. So, this innovative method, called Z to A technique can be used in teaching biochemistry more effectively. Hence, the present study was undertaken (i) To show that Z to A technique is one of the effective teaching method and (ii)To study the Students' perception about Z-A approach. **Method:** Two topics were taught using traditional lecture. Another 2 similar topics were taught by using Z to A approach. In Z-A approach, induction of the class was done with MCQs related to topic asking students to choose their answers and then the topic was taught. A post test was conducted for both methods at the end of the class. The post test scores of two methods were compared using Mann Whitney U test. Students' perception about method was also obtained with a questionnaire using Likert's scale. **Results**: It was found that mean post-test score by Z to A approach was better than traditional method which was statistically significant (p value- 0.001)Most of the students agreed that this method helped in concentrating in class, creating interest, improving learning & promoting active participation. **Conclusion** to A approach is an useful innovative method for teaching biochemistry for 1st MBBS students. Hence Z to A approach can be used in teaching not only biochemistry but any subject for medical students which can help them develop interest in the topic and concentrate better through the class.

IndexTerms **- Traditional lecture, Z-A approach, Biochemistry, Innovative teaching method.**

I. INTRODUCTION:

As a part of MBBS curriculum, Biochemistry is taught as one of the basic science subjects to 1st MBBS students. Biochemistry is the basis for all the disease processes. A good knowledge of this would help students in better understanding of biochemical changes occurring in various diseases and facilitate correlation with para-clinical and clinical subjects. But inadequate awareness of application of Biochemistry in the disease diagnosis and patient treatment during 1st year may lead to failure of understanding the clinical correlation.

Biochemistry is traditionally taught using lectures, practical classes and tutorials. Many innovative teaching methods are used to make teaching biochemistry more interesting and relevant. These modes will not only enhance the vividness of the class but also ensure that students concentrate and understand the concepts better. Medical school faculty should strive to enhance the quality by selecting the best teaching methods. It is important to encourage them to conduct teaching according to the tailor made system that matches with students' needs (1).

Students mostly do not give enough importance to biochemistry and are most often not interested in learning the concepts introduced during the class. This maybe because they do not get to visualize what they study or as it includes complex cycles or more often faculty do not stress on clinical relevance of the topic during the class. Probably lack of time could be an added factor as a result of which they tend to give more importance for exam preparation rather than understanding the concepts. Some approaches like creating study enthusiasm, self-assessment before class, and reviewing after class, absolutely ensure better teaching quality (2). We have tried these in one of the novel teaching method called Z to A approach.

Z to A approach is an innovative technique which explains the application of particular concept first and the concept taught later (3). This approach could be used by introducing the application of topic in the form of questions on all important concepts in the beginning of class and later teaching it. This will assist in creating more interest and help students to concentrate better though the class. In long term it may help students to remember and correlate application of Biochemistry better in real life situations. However, a literature search yielded that no such studies have been conducted in the field of medical education on this method so far.

Hence the present study was undertaken to see if, this novel and innovative method, Z to A approach can be used in teaching biochemistry more effectively.

II. Objectives:

- To study if Z to A technique is one of the effective teaching method.
- To study the Students' perception about Z-A approach

III. Materials and Methods:

It is a Quantitative interventional study. 1st MBBS students attending lecture class at a Medical college in Karnataka, India were included for the study. Institutional ethical committee approval was obtained. Students consent for participation also was obtained.

1st MBBS students were taught 2 topics on Vitamin A and Vitamin E using traditional lecture and another 2 similar topics on Vitamin D and Vitamin K by new Z to A approach by the same teacher (Fig 1) .In the new method, induction of the class was done with MCQs related to topic prepared by the teacher who took the class on all important aspects in the topic which students need to give more importance. Then the topic was taught. Later MCQ s were discussed again at the end of the class (Fig 2). A posttest, prepared by a different teacher, was conducted for both methods at the end of the topic and teacher taking the class was unaware of post test questions.

Statistical analysis of Post test scores were done using Mann Whitney U test.

Students' perception about Z-A approach was obtained using 5-point Likert's scale ranging from strongly agree, agree, neutral, disagree and strongly disagree. Perceptions were collected under the following headings (i) Creates Interest (ii) Helps concentrate in class (iii) Improves learning (iv) promotes active participation and (v) provides scope for correlation of concepts. The questionnaire was prevalidated by MEU members in the institution.

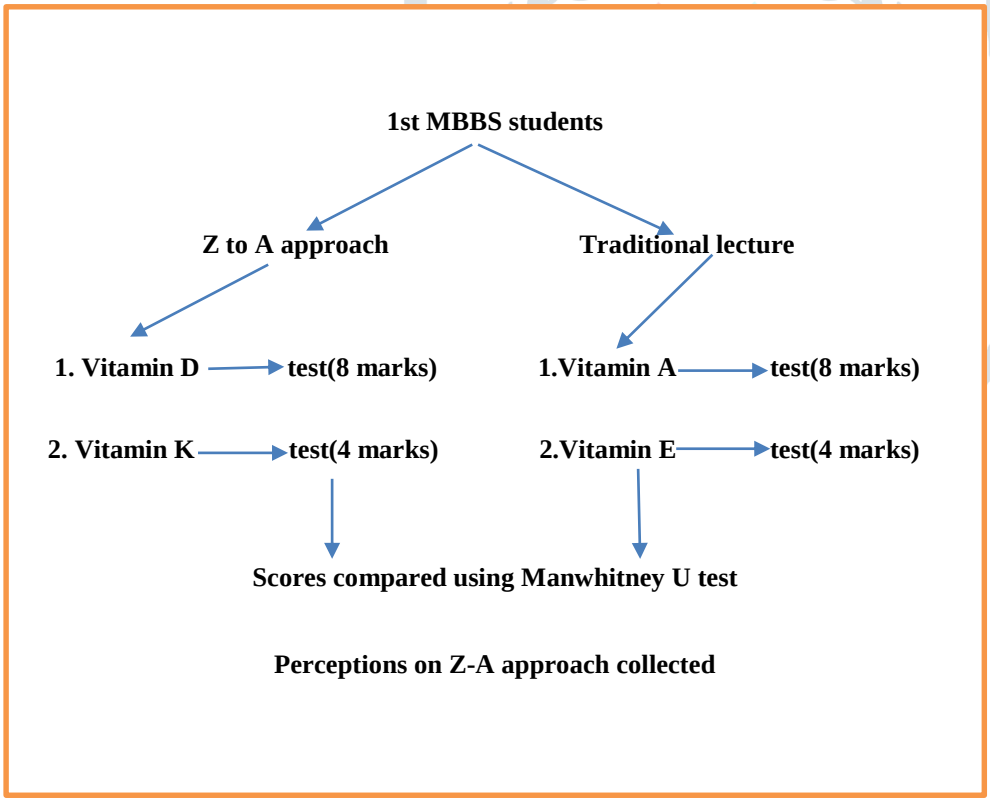

Fig 1. showing the method adopted to conduct the present study

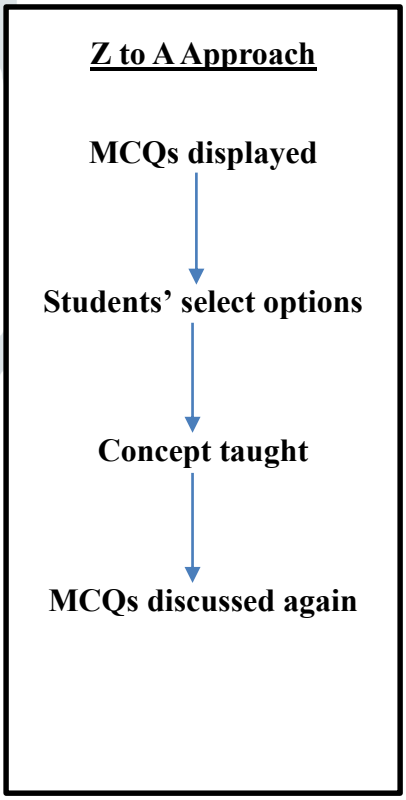

Fig 2. Flow chart of Z-A approach

IV. RESULTS:

All the students who attended the lecture class were included in the study. Out this 117 students participated in all the post tests. The results of these 117 students are considered for comparison of post test scores. The perception of all the students has been considered.

Table 1 and Figure 3, show the comparison of total post test scores by Traditional lecture and Z-A methods for different topics.

	Mean	Std. Deviation	Mean Difference	P Value
VIT D(8)N	6.21	1.252	0.394	0.009
VIT A(8)T	5.82	1.320		
VIT K(4)N	2.91	.952	0.462	0.001
VIT E(4)T	2.45	1.021		
Overall (14) N	8.04	2.942	0.800	0.001
Overall (14) T	7.24	2.861		

Table 1: Table showing the results of comparison between the Post-test scores obtained by students after Traditional method (T) and New Z-A method (N)

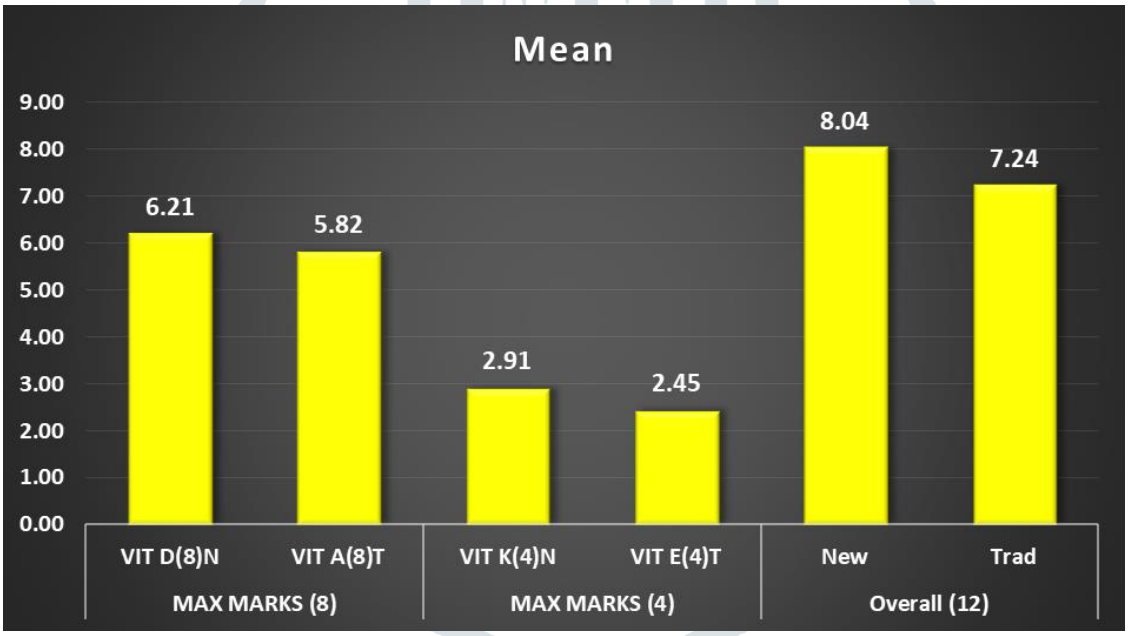

Fig 3: Bar diagram showing the results of Post-test score comparison between Traditional method (T) and New Z-A method (N)

The mean post test score for the topic on Vitamin A conducted by traditional method was 5.82 out of 8 marks and for Vitamin E also by Traditional method was 2.45 out 4 marks.

The mean post test score for the topic on Vitamin D conducted by Z-A approach was 6.21 out of 8 marks and for Vitamin K also by Z-A approach was 2.91 out 4 marks.

The mean post test score for the topics taught by Traditional method (T) was 7.24 and that by New Z-A method (N) was 8.04 out of 12. The mean difference between the scores by both methods was 0.800 which was found to be statistically significant (p value- 0.001).

Figure 4 shows the analysis of students' perception regarding Z-A approach under different headings revealed the following results.

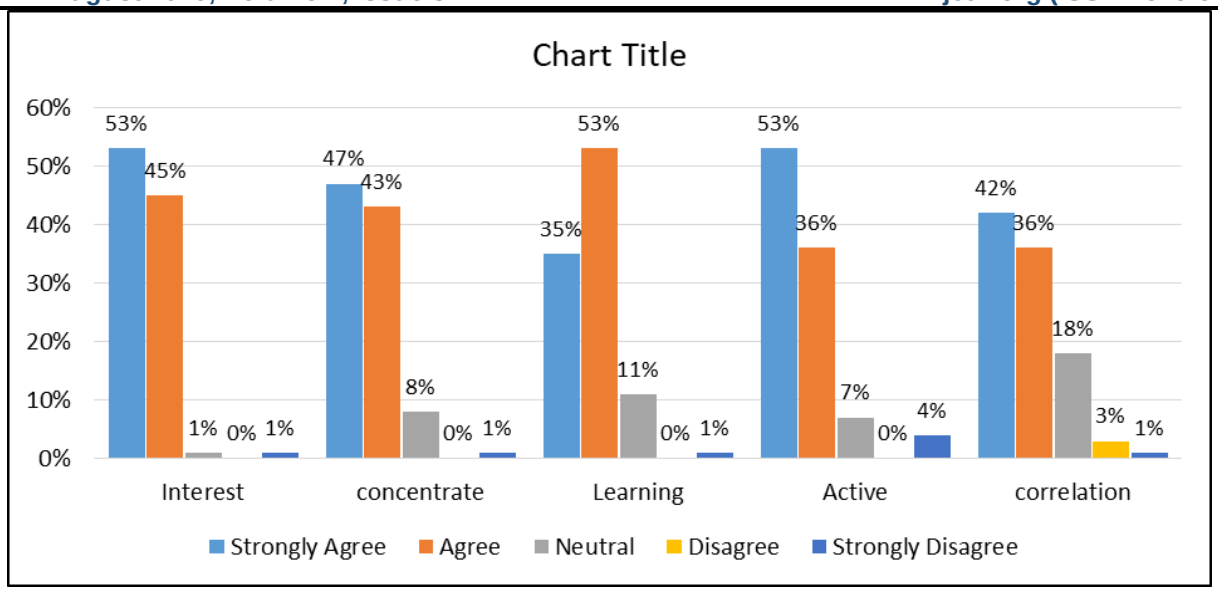

Figure 4: Bar graph showing the Likert' scale result on Students' perception of Z-A method

i) Creates Interest: 53% strongly agreed, 45% agreed, 1% were neutral and 1% strongly disagreed
ii) Helps concentrate in class: 47% strongly agreed, 43% agreed, 8% were neutral and 1% strongly disagreed
iii) Improves learning: 35% strongly agreed, 53% agreed, 11% were neutral and 1% strongly disagreed
iv) Promotes active participation: 53% strongly agreed, 36% agreed, 7% were neutral and 4% strongly disagreed
v) Provides scope for correlation of concepts: 42% strongly agreed, 36% agreed, 18% were neutral, 3% disagreed and 1% strongly disagreed

Hence, most of the students agreed that this method helped in creating interest (98%) , concentrating in class (90%), improving learning (88%), promoting active participation (89%) and correlating concepts (78%).

V. Discussion:

Biochemistry is one the pre-clinical subjects in undergraduate medical curriculum. Students find it difficult to comprehend this during class. They find biochemistry very complex to understand and remember due to which they lose interest. Another drawback is, as the students are not exposed to clinical sciences in first year, they are unaware of its future application and it is difficult for the teachers to educate the importance of such basic medical sciences in their clinical practice(4).

Traditionally, didactic lectures, tutorials, demonstrations are used as teaching methods in Biochemistry. Teaching through lectures is monotonous and is a widely used teaching method for a large group of students. Student-centered learning approaches appear to have been positively received by the students (5) Students settle down for a superficial learning approach if a content rich lecture is delivered regularly without understanding the application aspect of the concept. However, if active learning strategies are introduced compulsorily, they accept the challenge and involve enthusiastically in the process of learning. Studies have revealed that students are eager to accept active learning strategy (6). Hence, various innovative methods of teaching have been adopted recently to make learning the subject more interesting and relevant.

Case Based lecture is one such innovative method used where clinical cases are used for induction. Some of the authors have opined that introduction of CBL in medical education had positive outcomes. These include strengthening critical skills of medical students, such as problem solving, critical thinking, teamwork, time management, and best use of resources. But some of the challenges encountered while implementing these were the large students' number and a limited number of trained faculty capable of playing facilitators' role efficiently (7)

The students these days are very competitive and are more inclined towards exam oriented learning rather than learning the concepts and their application. Assessment plays a critical role in teaching and learning, but its power to improve student outcomes is still not used much. In one of the study, they have studied the impact of an integrated teaching model of an assessment strategy that emphasized relevance of learning. The authors have found that this approach increased the motivation of the students to learn biochemistry by helping them to see its relevance to the practice of pharmacy (8)

Z-A approach is one such method where, interest could be created using some questions as induction method. It is an innovative teaching method that has been used in teaching maths, research

methodology and for MBA students etc. They have used this method where the application aspect of a concept is explained first to generate interest and the concept is taught later (9).

A similar study was undertaken in our department and found students' post test scores were better in Z to A approach than traditional method. Students' perception about this method also revealed that Z to A approach helped to create interest and improve concentration through the class as the students would try to find answers to the questions displayed in the beginning.

Other authors also have opined that Z-A approach helps creates interest and improves concentration (3, 9,10). Some authors have also reported that this method could also create a long lasting memory and help in correlating of concept (10). We have not assessed the retention of knowledge and cannot comment on its effect on long term memory. This is the limitation of our study.

The drawback of this method is students concentrate more on the concepts on which questions are asked during the induction of the class. Hence the effectiveness of the method depends on the questions displayed in the beginning. Here lies a great responsibility of the facilitator to decide the questions that shall be displayed during induction. It should be efficiently planned so that the topics which are difficult and have clinic correlation should be given more importance while framing these questions.

VI. Conclusion:

Z to A approach is a novel innovative method for teaching biochemistry for 1st MBBS students. It is found that gain in knowledge is better by this method compared to traditional method. Students also opined it to be useful method. Hence Z to A approach can be used more frequently in teaching Biochemistry to help students develop interest and concentrate better. This approach could also be used to teach any other subject to medical students effectively

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