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A Role Play to Learn Metabolic Pathways in Biochemistry by MBBS Phase I Students

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ABSTRACT
Learning metabolic pathways in biochemistry is a very tedious. Monotonous and uninteresting to the MBBS phase I students. Role playing is an upcoming teaching approach in medical education as it provides a better understanding of the subject and to make the learning more interesting and joyous. So this study was conducted to known the learning outcome for metabolic pathways by a role play method of teaching. Fifty MBBS Phase I students were divided into two groups 1 and 2. First 25 included in group 1 and second 25 in group 2, each group containing 25 students. Then crossover of the groups and teaching learning methods was done so that both the groups were exposed to both teaching learning methods (traditional chalk and talk method and role play method). In the present study there was no statistically significant difference in learning outcome of the students using traditional method and role play method of teaching for the metabolic pathway in Biochemistry by MBBS phase I students. In open ended feedback and six questionnaires feedback form, students felt role play as a better method to learn metabolic pathway than traditional chalk and talk teaching method. The study concludes that role-play is an active and easy method to understand the core concepts and features involved in metabolic pathways.

INTRODUCTION

MBBS phase I students find difficult to learn and recall the metabolic pathways in Biochemistry which reduces their performance in the examination. Lectures are not as effective when it comes to stimulating thinking, inspiring interest in a subject, teaching behavioral skills and changing attitudes[1]. Small groups learning like role play, problem based learning, brainstorming sessions and many others encourages active learning and help the students to develop communication skills and teamwork skills[2,3]. Role playing is an upcoming teaching approach in medical education as it provides a better understanding of the subject and the acquisition and retention of knowledge[4]. So this study was conducted to known the learning outcome for metabolic pathways by a role play method of teaching.

Objective: To compare the learning outcome using traditional and role play method of teaching the metabolic pathway in Biochemistry by MBBS phase I students. To assess the students perception of the role play method of teaching in learning the metabolic pathways.

MATERIALS AND METHODS

Study design: The study was conducted in Department of Biochemistry of a Government Medical college in Karnataka. Institutional Ethical Committee and Institutional Scientific Committee approval was taken. It was mixed type, both quantitative and qualitative study. It was a cross over study conducted during the tutorials for a duration of around 2 hrs for MBBS phase I students. Around 50 MBBS phase I students who were willing to participate in the study were randomly selected and informed written consent was taken. The students were divided into two groups, first twenty five students as group 1 and next first twenty five students as group 2. The students were asked about the metabolic pathway which they feel difficult and the pathways which they suggested were included for traditional teaching and role play that is tryptophan and methionine metabolism.

For both the Teaching Learning methods, pretest was conducted before and posttest after each teaching learning method before crossover. In pretest and posttest 4 MCQs were set, each for one marks and validation was done by subject expert. Fig 1 students were taught tryptophan metabolism by traditional method (using chalk and talk method) and Fig. 2 students were taught methionine metabolism by role play method. Then the crossover of the groups and teaching learning methods was done so that both the groups were exposed to both teaching learning methods. That is, Fig. 2 students were taught tryptophan metabolism by traditional method and Fig. 1 students were taught methionine metabolism by role play method. The feedbacks were collected from all the students by Likert's 6 point scale and also open ended questionnaire.

Statistical analysis: In the present study scores between the groups were compared by student t test and Pre and Post test scores were compared by student paired t-test. Values are expressed in Mean±SD.

RESULTS

In the present study there was no statistically significant difference in learning outcome of the students using traditional method and role play methods of teaching for the metabolic pathway in Biochemistry by MBBS phase I students (Table 1).

Six questionnaires were asked in the feedback form in Likert's 6 point scale for role play and traditional teaching method. The student responses to the following questions for the role play were. Helped in answering MCQ test 72% of them were extremely satisfied, Active participation in learning 70% of them were extremely satisfied, Like to have similar exercise

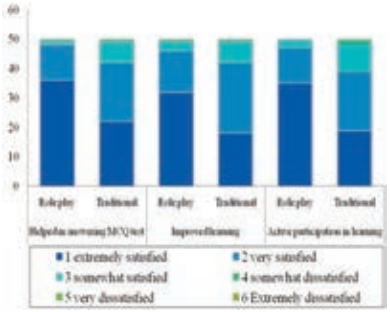

Fig. 1: Student's response for three questionnaires of the feedback form by Likert's 6 point scale for role play and traditional teaching method

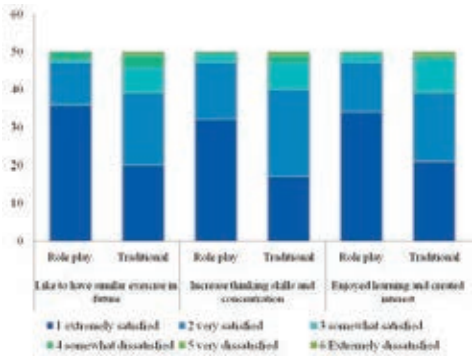

Fig. 2: Student's response for three questionnaires of the feedback form by Likert's 6 point scale for role play and traditional teaching method

Table 1: Mean marks scored by the students by traditional teaching and role play method

	Pre test	Post Test	p-value
Traditional	2.1±0.95	3.6±0.78	p<0.0001
Role play	2.2±1.07	3.7±0.50	p<0.0001
p-value	0.5774	0.4901	

Table 2: Student's responses for open ended feedback form for traditional teaching and role play method

Role play (40)		Traditional tutorial (10)	
Feedback	No. of responses	Feedback	No. of responses
It involves each ones active participation	9	More topic is covered in short time	10
Enhances our knowledge	2		
Generates a lot of interest and helps in learning	6		
Enhances group discussion and communication skill	3		
Good to understand the concept clearly	8		
It is an innovative way of learning and enjoyed learning	3		
We came across our mistakes in understanding the metabolism	1		
Does not feel sleepy	1		
Time consuming	2		
Makes easy and useful to remember	7		
Remain in mind/ memory for long time	2		
Time consuming	2		
Every student does not take it seriously	1		

in future 72% of them were extremely satisfied (Fig. 1 and 2). In open ended feedback, forty students felt role play as a better method to learn metabolic pathway than traditional teaching method because of the following reasons. It involves each ones active participation, Enhances our knowledge, Generates a lot of interest and helps in learning, Enhances group discussion and communication skill, Good to understand the concept clearly, It is an innovative way of learning and enjoyed learning, We came across our mistakes in understanding the metabolism, Does not feel sleepy, Makes easy and useful to remember, Remain in mind/ memory for long time. (Table 2) In the open ended feedback ten students gave that traditional teaching is better than role play as more topics can be covered in less time.

DISCUSSIONS

Learning biochemistry can sometimes become very monotonous and uninteresting since it does not involve any interaction with patients and hospital postings[5]. So many teaching methods are developed to engage students in learning and to increase their active participation and critical thinking rather than emphasizing rote memorisation of scientific concepts and facts[6].

There is no statistically significant difference in learning outcome of the students using both Teaching Learning methods. The feedback from the students stated that the role-play helped them to understand the core concepts clearly and this study is supported by other studies[6,7]. In a study students opined in their feedback that the role-playing sessions helped them to better visualize the disorders and to retrieve the most important features seen in specific neurological abnormalities. The students also stated that the method made them very active and the lecture more meaningful. Role-play lectures were an effective, economical and easily reproducible method for better understanding the core concepts and features involved in different neurological diseases[7].

The study used role play game (RPG) based classes methodology to teach and Learn cellular biology. They found that the students accepted the methodology and were willing to use it. The study also stated that role play games type of class may improve the acquisition of skills such as cooperation and creativity. In role play games the players act together and in a coordinated fashion to succeed at the proposed challenges[8,9].

A study by Surapaneni KM stated that when learning is integrated with game-based approach to learn metabolic pathway in biochemistry it made the learning process fun filled and installed motivation and curiosity in student's minds in order to understand and learn complex concepts with ease and in a more self-directed and self-evaluative manner and helps in overcoming the drawbacks of conventional classroom teaching[10].

CONCLUSION

The study concludes that role-play is an active and easy method to understand the core concepts and features involved in metabolic pathways. It also enhances the group discussion, communication skill and acquisition of skills such as cooperation and creativity which aids the social construction of knowledge.

Limitations: The study was conducted in a small group of 50 students so it has to be conducted in the large number of students to get more statistical significant results. In this study short term retention of knowledge is tested and long term retention is not tested. In the present study the students were not divided into slow learners and fast learners.

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