

# Evaluation of Students' Perceptions Towards An Innovative Teaching-Learning Method During Pharmacology Revision Classes: Autobiography of Drugs

ANURADHA JOSHI<sup>1</sup>, JAISHREE GANJIWALE<sup>2</sup>

## ABSTRACT

**Introduction:** Various studies in medical education have shown that active learning strategies should be incorporated into the teaching-learning process to make learning more effective, efficient and meaningful.

**Objectives:** The aim of this study was to evaluate student's perceptions on an innovative revision method conducted in Pharmacology i.e. in form of Autobiography of Drugs. The main objective of study was to help students revise the core topics in Pharmacology in an interesting way.

**Settings and Design:** Questionnaire based survey on a newer method of pharmacology revision in two batches of second year MBBS students of a tertiary care teaching medical college.

**Materials and Methods:** Various sessions on Autobiography of Drugs were conducted amongst two batches of second year MBBS students, during their Pharmacology revision classes.

Student's perceptions were documented with the help of a five point likert scale through a questionnaire regarding quality, content and usefulness of this method.

**Statistical analysis used:** Descriptive analysis.

**Results:** Students of both the batches appreciated the innovative method taken up for revision. The median scores in most of the domains in both batches were four out of five, indicative of good response. Feedback from open-ended questions also revealed that the innovative module on "Autobiography of Drugs" was taken as a positive learning experience by students.

**Conclusions:** Autobiography of drugs has been used to help students recall topics that they have learnt through other teachings methods. Autobiography sessions in Pharmacology during revision slots, can be one of the interesting ways in helping students revise and recall topics which have already been taught in theory classes.

**Keywords:** Active learning, Medical students' perception, Pharmacology education, Reinforcement

## INTRODUCTION

Over the past few years, medical teaching is changing and adapting newer teaching techniques which are more students friendly. Teaching and learning in Pharmacology is in a constant stage of reformation, being driven by various pressures like pressure from within the discipline itself, from professional bodies, students, as well as due to changes in teaching style [1]. Pharmacology subject although crucial for physicians, is perceived as dry and volatile by medical students [2]. Due to content overload, students often find it difficult to remember and recall the pharmacological terms, concepts and drug names in the subject [3]. Need is to develop innovative active learning modules both in and outside classrooms, which in turn will foster more of interaction among students, kindle their enthusiasm, create significant learning environments and in turn help in recall of topics [4,5].

The present study emphasizes on introduction of one such innovative Teaching-Learning method: 'Autobiography of Drugs', during revision sessions in Pharmacology. The concept of autobiography of drugs is inspired by a lucid and exhilarating popular science fiction book titled 'Genome', authored by Matt Ridley [6]. In this book the author picks up newly discovered gene from each of 23 pairs of chromosome and tells its story in form of an autobiography. Matt Ridley himself was inspired to adopt this model from a classic novel titled 'The Periodic Table', written by author Primo Levi's, published in year 1975, which is a collection of short stories, and is named after the periodic table in chemistry. Here the stories are autobiographical episodes of the author's experiences as a Jewish-Italian doctoral-level chemist. Every story (21 in total) has the name of a chemical element and is connected to it in some way [7].

The current study highlights application of such concepts in Pharmacology education during revision classes. Autobiographies of drugs are designed in such a way as if the drug is speaking about itself to the students. It can either start with narration of some hallmark interesting features related to drug dose, some peculiar pharmacokinetic or specific pharmacodynamic features, with its application in clinics, adverse drug effects of drug or cost of various formulations of the drug available in market. One can even add description of drugs which have an interesting history of discovery and features e.g. Adrenaline, Heparin, Serotonin etc. Some interesting phrases can also be added in Autobiography of drugs e.g. "I am your life saver" for drugs like Adrenaline. Thus set of questions that are prepared giving interesting links or clues to what the unknown drug or group of drugs may be, is called as "Autobiography of drugs". While it is an interesting way of helping student's revises, such sessions also break the academic monotony.

## AIMS AND OBJECTIVES

To find the perceptions of second year medical students towards an innovative teaching-learning technique: Autobiography of drug that was used during revision classes in Pharmacology.

## MATERIALS AND METHODS

This study was conducted in Department of Pharmacology, in a medical college in western India in two consecutive years. Students entering medical college in years 2008 and 2009 were included in the study when they were in their second year medical professionals. The study was duly approved by Human research ethics committee. Sessions on 'Autobiography of drugs' were conducted in both the

batches during their revision time. The topics to be revised under Autobiography sessions were announced to the students also were displayed on notice board two weeks before the session. Students were duly informed that the revision of displayed topics was to be conducted in a different way and that their participation was voluntary. Their refusal to participate would not affect them in any ways i.e. in terms of their assessment or any future reports or examinations. Written informed consent was also taken from the students who were willing to participate and revise Pharmacology by this innovative method. The topics covered in revision classes were: Drug therapy of Acid Dyspepsia, Hormones, Drugs from Cardiovascular System and Non Steroidal Anti-inflammatory Drugs. Brief Autobiographies (Total 5) related with the topics mentioned were specifically designed by the teacher, consensually validated by other subject experts. At the end of each autobiography, questions were displayed covering various aspects of given topic with special emphasis on Pharmacokinetics (PK), Pharmacodynamics (PD), Pharmacotherapeutics (PT), Pharmacovigilance (PV) and Pharmacoeconomics (PE). The content of each autobiography was formulated keeping in mind the time constraints while conducting undergraduate classes. They were neither very short text nor very long descriptions. Students were suppose to identify the name of drug or group of drug. Clear instructions were given along with the description.

Each batch of students was divided into 5 groups (approx 20 students per group) for making the process manageable due to large class strength (approximately 100). Smaller groups helped in easy facilitation and also ensured more student involvement. One by one Autobiographies were displayed using a power-point presentation (one group at a time). Each Autobiography was displayed for a time span of about 7 to 8 minutes and each group of students was suppose to identify and discuss the drug or the group of drug and answer the related question in next five minutes. The teacher also discussed answers to the questions at end, to ensure proper learning. A total of 5 such sessions of autobiographies were conducted in a time span of one hour 15 minutes for all five groups. Following this, in next class, anonymous semi structured feedback on perception about each session was taken from all the participating students (with the help of an independent faculty) on quality, content and usefulness of the sessions on a 5 point likert Scale from 'Excellent' (5) to 'Below average' (1). Descriptive analysis of the responses on this likert scale was then done to summarize the data.

Students rated their perceptions regarding quality (Whether they liked the presentation), content (How would they rate the method on content presented) and usefulness of this method (How would they score on usefulness of this method- whether it helped them in re-enforcing their concepts and recall). At the end they were also asked for their comments on advantages and/or limitations as well as suggestions to improve the revision module.

## RESULTS

Total number of participants was 174 out of 188, clubbing the two batches. Out of 90 students of 2008 batch, 81 that were present on the day of the study and likewise out of 98 students of 2009 batch, all 93 were present on the day and willingly participated in the study. The mean score for different sessions in both batches ranged between 3.37-4.01 [Table/Fig-1]. Overall the innovative module on "Autobiography of Drugs" was perceived to be a positive and an active learning experience. It was accepted well in terms of quality, content and usefulness to medical students. The mean score in all five modalities of pharmacology teaching were on an average found to be good (more than 3.5). The Median (IQR) in most of the domains for all five modalities was found to be 4.

From responses to the open ended question at the end of questionnaire, the gist that can be understood for advantages/

disadvantages or any other suggestions from the participating students can be summarised as:

### Pros of the method (as mentioned by students)

- This method of revising Pharmacology was enjoyable as it generated more fun and interest in learning according to them (92% students).
- They also expressed that it helped them improve their foundational knowledge (92% students).
- They felt that this method of Teaching - Learning helped them to understand and remember specific information and ideas effectively (87% students).
- Majority wished this to be a frequent way of teaching-learning as it helped to increase individual thinking and interest during class (87% students).

### Cons of the method (as mentioned by students)

- All topics cannot be covered by this method.
- This method is time consuming in terms of planning and execution both.

**Our understanding of disadvantages of the method:** Preparing such autobiographies is time consuming and requires a lot of planning and innovative thinking on the part of teacher because as far as possible the autobiographies have to be formulated in an interesting way to catch students' attention. Thus the amount of pre-class preparation time needed is greater than that needed in a traditional revision class.

The method is not really suitable for use as a front-line teaching method independently, since it cannot, by itself, be used to teach basic facts and principles of the subject. Thus, the method should be used in a supportive role, in conjunction with other methods such as lectures.

**Suggestions by students:** Students were of the opinion that such modules can be conducted at end of every lecture as a means to recap. They expressed that it would help them to get a quick review of the topic taught in class in a more interesting manner.

The students felt that if the teacher would announce prior to taking the lecture that "At the end of lecture class, a brief autobiography

Domains	Mean	SD	Median	I.Q.R.*	Mean	SD	Median	I.Q.R.*
<b>PK (Pharmacokinetics)</b>								
Quality	3.67	0.079	4	1	3.51	0.089	4	1
Content	3.68	0.087	4	1	3.43	0.096	3	1
Usefulness	3.85	0.091	4	1	3.63	0.110	4	2
<b>PD (Pharmacodynamics)</b>								
Quality	3.74	0.08	4	1	3.53	0.096	3	1
Content	3.83	0.076	4	1	3.37	0.099	3	1
Usefulness	4.01	0.087	4	2	3.59	0.101	4	1
<b>PT (Pharmacotherapeutics)</b>								
Quality	3.72	0.096	4	1	3.61	0.098	4	1
Content	3.78	0.109	4	1	3.55	0.102	4	1
Usefulness	3.85	0.108	4	2	3.73	0.098	4	1
<b>PV ( Pharmacovigilance)</b>								
Quality	3.59	0.099	4	1	3.49	0.097	4	1
Content	3.59	0.106	4	1	3.44	0.104	3	1
Usefulness	3.67	0.127	4	2	3.55	0.110	3	1
<b>PE (Pharmacoeconomics)</b>								
Quality	3.37	0.093	3	1	3.6	0.105	3	1
Content	3.40	0.101	3	1	3.44	0.101	3	1
Usefulness	3.55	0.115	3	1	3.65	0.104	4	1

**[Table/Fig-1]:** Individual perception of medical student of 2 batches for sessions on autobiography of drug  
\* I.Q.R.: Interquartile range

will be displayed and questions will be asked pertaining to the topic covered in that class", this will foster a healthy competitive spirit among students and also would help in increasing their attention spans during their theory classes. Although we never intended to include this as any assessment tool for any of the exams, some students (5%) perceived so and expressed their concerns. Some students (16%) also reported that this activity helped them prepare and review material from their past lecture classes. Also, it helped them remember topic in a different way. At the same time they felt need for a facilitator or a tutor for each small group for better conduction of the process.

## DISCUSSION

Active learning is a learning activity which engages students actively in a classroom through different methods unlike didactic lectures where students listen passively to an instructor's lecture. This type of approach should preferably be employed for teaching most major topics as it avoids overemphasis on lecturing, with the utilization of other active learning techniques. This can be possible with teachers' creativity, special interest and good practice of learner centric approach. With inclusion of various innovative approaches in teaching – learning only we can expect to realize exciting kinds of learning in various integrated medical courses and any higher education in general [4]. Some of the major characteristics associated with active learning strategies include: learner centred approach, students are in receipt of an immediate constructive feedback from their instructor and also students are made to get involved in higher order thinking. Creating a classroom environment where students are actively learning, can create boundless rewards and benefits like: reinforcement of course content, enhanced student self esteem, development of creative problem solving skills, promotion of concepts of discovery learning, energized and invigorated participants, strong learner bonds etc involving variety of attributes and thus accommodating diverse student learning styles [8]. Finally it helps improve student retention and motivation and offers an enjoyable and exciting learning environment.

In summary, in context of a college classroom, active learning involves students in doing things themselves and thinking about the things they are doing. Fundamental need is to provide specific ideas on how to change the way we teach so that significant learning happens more frequently for students. Research and anecdotal evidences overwhelmingly support the claim that students learn best when they are engaged with course material and they actively participate in their learning [9-12].

Efforts towards developing active learning is based on meaningful learning which ensures understanding and applying concepts rather than only memorizing and practising rote learning [12]. Students readily attend such 'group' activities, prepare well to discuss the assigned topics, actively engage themselves and contribute more in the activities compared to 'one to one' questioning [13,14].

While one of the constructivist theory of learning also emphasizes on this fact that a student's conceptual understanding improves when the student is actively engaged in the learning process [15], numerous studies show that passive instructional approaches, although efficient at covering a lot of material, are not effective at promoting meaningful learning [16-20]. While the global trend toward rationalizing teaching-learning is gathering momentum toward dynamic mindset instead of traditional didactic lectures [21-24], in recent years, the Liaison Committee on Medical Education has emphasized reductions in the number of passive basic science lectures and a shift to a more active learning environment [25].

Even the most skillfully crafted lectures become monotonous after sometime, so incorporation of such modules in lectures can help to maintain interest and increase the quality of student learning in the subject of Pharmacology. Activation of prior knowledge and recall of information can lead to conceptual change in the way students learn.

## LIMITATIONS OF THE STUDY

Because the objective of the study was only to find the perception and readiness to accept the newer method for revision by the medical students, we did not consider a control group for any comparison.

## CONCLUSION

Concepts of active learning, is gaining attention especially in field of medicine as it involves providing opportunities for students to meaningfully talk, listen, write, read and reflect on content and ideas of an academic subject. Autobiography of drugs has been used to help students recall topics that they have learnt through other teachings methods. However, it is not a replacement for lectures at all. Herein, it was used in revision times and students were asked to guess what the drugs were or which group was depicted in the answer.

Autobiographies can be considered to be accommodated either at the end of a lecture in large classrooms or can be incorporated in revision classes or tutorials. Use of such modules helps to increase enthusiasm, sustain interest and help in better recall of a previously learnt topic in any given subject.

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**PARTICULARS OF CONTRIBUTORS:**

1. Associate Professor, Department of Pharmacology, Pramukhswami Medical College, Karamsad, Gujarat, India.
2. Assistant Professor, Department of Community Medicine & Central Research Services, Pramukhswami Medical College, Karamsad, Gujarat, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Anuradha Joshi,  
Associate Professor, Department of Pharmacology, Pramukhswami Medical College,  
Karamsad, Gujarat - 388325, India.  
E-mail : anuradhaj@charutarhealth.org

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