

Jig saw technique: An interactive approach to sensitize medical students in Saudi Arabia about type 2 diabetes mellitus

Rahul R. Bogam^{1,*}, Abdul Sattar Khan²

¹Assistant Professor, ²Assistant Professor & Head, Dept. of Family & Community Medicine, College of Medicine, King Faisal University, Kingdom of Saudi Arabia

***Corresponding Author:**

Email: rhl_bogam@yahoo.co.in

Abstract

Lectures are often being criticized for being one way passage of information and their educational value can be enhanced by making them interactive and collaborative. Various research studies have found a appreciate relationship between the higher cognitive and affective outcomes and cooperative learning approaches. Jig saw technique is a form of cooperative and collaborative learning strategy which is extensively used in all levels of education. The Jigsaw technique is a method of organizing classroom activity that makes students dependent on each other to succeed. It breaks classes into groups and breaks assignments into pieces that the group assembles to complete the jigsaw puzzle. The present study was an undertaken to assess the effect of Jig saw technique on knowledge of medical students of King Faisal University about various aspects of Type 2 Diabetes Mellitus.

An interventional study was conducted among 79 male undergraduate medical students of College of Medicine, King Faisal University, Kingdom of Saudi Arabia. Pre and post intervention was conducted with an application of Jig Saw technique. The marking system for each complete question was assigned for pre and post intervention. The data was entered in 'Microsoft Office Excel Sheet' and analysed by using 'Paired t test'.

Jig Saw Technique helped in enhancing the knowledge of participants and difference was found to be statistically significant. ($t = 9.36, p < 0.001$).

This Simple teaching methodology can make significant gain in knowledge of medical students regarding Diabetes Mellitus type -2.

Keywords: Diabetes Mellitus, Jig Saw Technique, Knowledge, Medical Students.

Introduction

Lectures are often being criticized for being one way passage of information and their educational value can be enhanced by making them interactive and collaborative.⁽¹⁾

College of Medicine, King Faisal University has adopted the 'Problem based curriculum' to facilitate student-centred pedagogy in which students learn about a subject through the experience of solving an open-ended problem. Problem-based learning is a cooperative learning which explores the importance of placing students in control of their own learning.

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning.⁽²⁾ Various research studies have found a appreciate relationship between the higher cognitive and affective outcomes and cooperative learning approaches.^(3,4,5)

Jig saw technique is a form of cooperative and collaborative learning strategy which is extensively used in all levels of education. It allows students to actively participate in learning process. The Jigsaw technique is a method of organizing classroom activity that makes students dependent on each other to succeed. It breaks classes into groups and breaks assignments into pieces that the group assembles to complete the jigsaw puzzle.⁽⁶⁾

The present study was an undertaken to assess the effect of Jig saw technique on knowledge of medical

students of King Faisal University about various aspects of Type 2 Diabetes Mellitus.

Objective

To assess the effect of 'Jig Saw Technology' on knowledge of undergraduate medical students of King Faisal University, Saudi Arabia about Type 2 Diabetes Mellitus.

Material and Methods

Study Area: The study will be implemented at College of Medicine, King Faisal University, Al-Hasa, Kingdom of Saudi Arabia

Study Design: Interventional study

Study Population: All students from one of the randomly selected blocks of first year MBBS will be included as study participants.

Methods

Pre-intervention phase: Ethics approval was taken from respective Institutional Ethics Committee / Research Committee. Informed Consent was also be obtained from participants after explaining the purpose of study and anonymity of participants was guaranteed. A structured pretested self-administered questionnaire consisting of 10 close ended questions; was given to all study participants. All questions were based on various aspects of Type 2 Diabetes Mellitus like epidemiology, clinical signs and symptoms, diagnosis, treatment and

prevention etc. The participants were asked to complete questionnaire in 10 minutes under strict supervision.

Intervention phase

- Sensitization of participants about application of Jig saw technique.
- Allocation of participants into four Jig Saw groups.
- Identification of leader for each group for smooth functioning of group.
- Each group was assigned *specific one segment* of Diabetes Mellitus and it will be ensured that

participants of that group had direct access only to their own segment.

- Sufficient time (30 minutes) was given to each group to study subject matter.
- Reallocation of groups like A1, B1, C1, D1.....A4, B4, C4, D4.
- Sufficient time (30 minutes) was given to each group to study subject matter.
- Evaluation of participants knowledge by faculty.

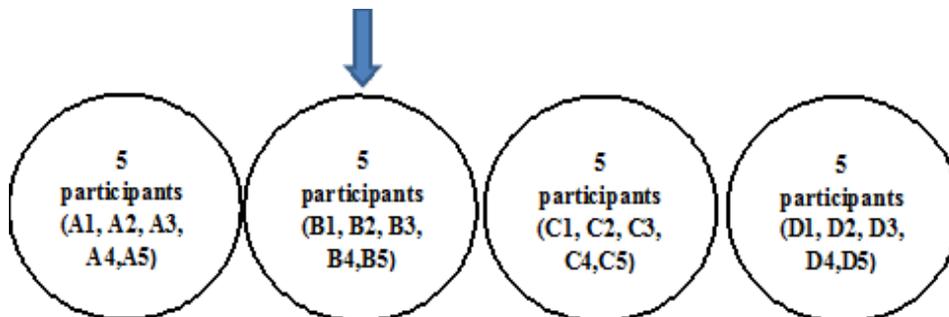


Fig. 1

Post-intervention phase: At the end of programme, the same questionnaire was given to all participants and responses were collected.

Data Analysis: The marking system for each complete question was assigned for pre and post intervention. The data was entered in ‘Microsoft Office Excel Sheet’ and analysed by using ‘Paired t test’.

Results

A total 79 male undergraduate medical students participated in the study. All participants were in the age bracket of 20-25 years. Table 1 indicates that simple educational innovation like ‘Jig Saw Technique’ helped

in enhancing the knowledge of participants and difference was found to be statistically significant.(t = 9.36, p <0.001).

Table 1: Mean marks of study participants (n= 79)

	Mean marks (out of 10)	S.D.	t-test	p-value
Pre-intervention	5.32	0.94	9.36	<0.001
Post-intervention	9.56	0.50		

Table 2: Questions with Correct Response (n =79)

Question	Correct response	No. of participants with correct response in pre-intervention (%)	No. of participants with correct response in post-intervention (%)
As per International Diabetes Federation, the prevalence of type 2 Diabetes in Saudi Arabia is	17.6%	58 (73.41)	78 (98.73)
Blood sugar is well controlled when Haemoglobin A1C is	Below 6.5%	46 (58.22)	74 (93.67)
Prediabetes is NOT associated with one of the following	Increased risk of developing type 1 diabetes	61 (77.21)	72 (91.13)
Which drug causes hyperglycaemia via β-cell destruction	Streptozocin	72 (91.13)	79 (100)
The hormone that is secreted by the alpha cells of the pancreas that raises blood glucose when levels are low is:	Glucagon	48 (60.75)	66 (83.54)
Type 2 diabetes is characterized by	Insulin resistance	51 (64.55)	76 (96.20)

Metformin is contraindicated in following condition	Renal impairment	48 (60.75)	74 (93.67)
Infants of Diabetic mother are likely to have following cardiac anomalies	Transposition of great arteries	46 (58.22)	72 (91.13)
Following is NOT complication of Diabetes Mellitus	Gastro-oesophageal reflux disease	51 (64.55)	77 (97.46)
Following is NOT Life threatening complication of diabetes mellitus	Emphysematous appendicitis	42 (53.16)	74 (93.67)

Discussion

Saudi Arabia has one of the highest percentages of Diabetes Mellitus in the world. Being a future health care professionals, there is strong need for undergraduate medical students to understand basic aspects of Diabetes like Epidemiology, clinical signs and symptoms, diagnosis, prevention and treatment etc. Considering this fact, present study was undertaken to educate students about Diabetes Mellitus with innovative teaching methodology i.e. Jig saw Technique.

One of the major advantages of the Jigsaw technique that it eliminates competition in the classroom and enhances the cooperation among the students.⁽⁷⁾ Jacobs also opined that it is essential for students to see each other as collaborators and not as competitors.⁽⁸⁾

In present study, Jig saw exercise was well perceived by participants as indicated statistical gain in marking system in post intervention phase. Present study finding corroborates with study finding of Bhur G.T. Lakshmi R⁽⁹⁾ also reported that Jig saw technique was found to be effective in teaching students. Bassendowski and Petrucka employed the jigsaw strategy at the University of Saskatchewan and this study demonstrated that this approach was highly effective in generating and delivering comprehensive information from and to the students.⁽¹⁰⁾

Eldin studied the effectiveness of the jigsaw strategy on student participant's learning at Damanhour University and showed that the students gained knowledge from the interactive learning process.⁽¹¹⁾ Another study in Oman has evaluated the effectiveness of Jig saw method among a group of Arab students.⁽¹²⁾ The study showed that the students enjoyed the method and that the approach was effective in improving the academic scores of the students.

Persky and Pollack assessed the use of jigsaw approach in teaching renal clearance concepts among a group of medical students and showed that the jigsaw approach was successful in enabling learning among students.⁽¹³⁾ In another study, Earl used the jigsaw learning model in studying the students' learning abilities in analysis of tertiary drug information resources and it was found to be effective.⁽¹⁴⁾

In present study, even though the post test score of participants was high, pre-test score shows poor knowledge of participants about few aspects of Diabetes Mellitus like Glycosylated Haemoglobin, complication

of Diabetes, Metformin, Glucagon etc. (Table 2). It reiterates the need for sustained training of under graduate students for this crucial health problem.

Conclusion and Recommendations

The present study reported inadequate knowledge of Diabetes Mellitus amongst undergraduate medical students before application of Jig Saw method. This Simple teaching methodology can make significant gain in knowledge of medical students regarding Diabetes Mellitus type -2. Traditional didactic lecture method needs to be replaced by interactive method like Jig Saw to facilitate learning among medical students. Similar methods can be implemented to sensitize students about other health related issues.

References

1. Tejinder Singh et al. Principles of Medical Education, 4th Edition, New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.; 2013.p-3.
2. David W Johnson and Roger T Johnson. An Overview of Cooperative Learning. Available from <http://www.co-operation.org/what-is-cooperative-learning/> (accessed on 15th June 2016).
3. Johnson, D. W., & Johnson, R. New Developments in Social Interdependence Theory. Genetic, Social, & General Psychology Monographs 2005,131(4),285-358.
4. Tran, V. D., & Lewis, R. (2012a). Effects of Cooperative Learning on Students at An Giang University in Vietnam. International Education Studies, 5(1),86-99.
5. Tran, V.D., & Lewis, R. (2012b). The effects of Jigsaw Learning on Students' Attitudes in a Vietnamese Higher Education Classroom. International Journal of Higher Education, 1(2),1-13.
6. Lestik, M., & Plous, S. Jigsaw Classroom 2012. Available from <https://www.jigsaw.org/> (accessed on 27th August 2016).
7. Mark W. Dollard & Kate Mahoney. How effective is the Jigsaw Method When Used to Introduce New Science Curricula in Middle School Science? Ontario Action Researcher 2011;10:1-5.
8. Jacobs, G. M. Foundations of cooperative learning. Paper presented at the Meeting of the Hawaii Educational Research Association, Honolulu, 1991.
9. Buhr GT, Heflin MT, White HK, Pinheiro SO. Using the jigsaw cooperative learning method to teach medical students about long-term and post-acute care. J Am Med Dir Assoc. 2014 Jun; 15(6):429-34.
10. Bassendowski, S. L., & Petrucka, P. M. Puzzle patterns: Research day interactive strategy. Nurse education in practice 2006 6(1),40-46.

11. Eldin, Y. K. Z. Implementing Interactive Nursing Administration lectures and identifying its influence on students' learning gains. *Journal of Nursing Education and Practice* 2014 4(5),107.
12. Lakshmi, R. Visiting cooperative teaching learning: A study to assess the effectiveness of its application to Arab nursing students, at Oman Nursing Institute, Muscat. *The Journal of Nursing Trendz*, 2013;4(3),21-25.
13. Persky, A. M., & Pollack, G. M. A hybrid jigsaw approach to teaching renal clearance concepts. *American journal of pharmaceutical education* 2009.73(3).1-6.
14. Earl, G. L. Using cooperative learning for a drug information assignment. *American journal of pharmaceutical education* 2011,75(7).1-5.