ORIGINAL ARTICLE

Small Group Discussion for Medical Students to Learning Embryology

Parastou Rad[1], Amrollah Roozbehi[2], Hamdollah Delaviz[3,*]
[1]Department of Midwifery, Faculty of Nursing, Yasuj University of Medical Sciences, Yasuj, Iran
[2]Department of Anatomy, Faculty of Medicine, Yasuj University of Medical Sciences, Yasuj, Iran
[3]Cellular and Molecular Research Center, Yasuj University of Medical Sciences, Yasuj, Iran
[*]Yasuj University of Medical Sciences,
Shahid Motahari Blv.
Yasuj, 7591994799,
Iran

Tel: +98 74 33230290
Fax: +98 74 33230290
E-mail:
delavizhamdi83@gmail.com

Background: One of the most important issues is the best method to teach embryology course to medical students. Small group discussion (SGD) were used to working together, integral to learning developing intellectual skills and interactive learning experience.

Methods: The 72 medical students were equally randomized to the SGD (group I) and usual lecture based teaching (LBT), (group II) in general embryology course. The position of both groups changed in systems-base embryology. A pre-test and two of post-tests (beginning; midterm for general embryology; final for systems-base embryology) were used to assess embryology knowledge of students with using an independent t-test. The questionnaire were designed to collect the attitudes of the students about the SGT.

Results: Results showed no significant difference of the mean score between the two groups from the pre-test. The mean score of the SGD group compared to the LBT group significantly increased in general embryology (17.9±2.2, n=33 vs. 15.3±1.1, n=35) and in system-base embryology (17.5±1.2, n=31 vs. 14.3±3.2, n=32). Based on the questionnaires data, SGT was useful for effective interactivity (87.85%) and interpret the congenital disease. Students interested to use of the SGD in other course (86.47%) and they agreed (87.8%) traditional teaching methods **are** better for learning embryology.

Conclusion: The SGT creating more collaboration, good performance, active participation, improves the anatomy knowledge and attitudes of medical students. Result suggested we will use of this teaching strategy in our university.

Keywords: Embryology, Medical students, Small group discussion

مناقشة جماعية صغيرة من أجل تعلم مادة الجنين طلاب الطب البشرى

الأرضية والهدف : هناك تساؤل عن أكثر طريقة مفيدة لتدريس مادة علم الأجنة لطلاب الطب البشرى . لقد استفيد من المناقشة الجماعية الصغيرة (SGD) من أجل التعاون ، التعلم ، المهارة الفكرية ، التجربة ، والمعاملة الأفضل.

الطريقة : تم تقسيم ٧٢ طالب طب في مادة علم الأجنة بشكل متساوى وعشوائى إلى مجموعتين مجموعة مناقشة المجموعة الصغيرة ومجموعة التعليم العادى المبنى على الخطابة. تم تغيير مكان كل مجموعة فى درس علم الأجنة الإختصاصى . من أجل تقييم معلومات مادة علم الأجنة للطلاب تم وضع إختبار قبل البدء بالدورة وإختبارين بعد الإنتهاء من الدورة (إمتحان قبل الدورة وفى منتصف الدورة لطلاب درس علم الأجنة العمومية . إمتحان نهائى لطلاب درس علم الأجنة الإختصاصى) تم أيضاً الإستفادة من إختبار T المستقل . تم وضع ورقة أسئلة إستفسارية من أجل جمع أراء الطلاب عن مناقشة المجموعة .

الحاصل : أثبتت النتائج عدم وجود تفاوت واضح فى متوسط علامة المجموعتين فى إختبار قبل الدورة . تبين أن مجموعة المناقشة الجماعية الصغيرة (SGD) كان معدلها أعلى بالمقارنة مع مجموعة التعليم العادى المبنى على الخطابة (LBT) وذلك فى مادة علم الأجنة العمومية وكانت النتيجة (17.9±2.2, n=33 vs. 15.3±1.1, n=35) وكذلك فى مادة علم الأجنة الإختصاصية وكانت النتيجة (17.5±1.2, n=31 vs. 14.3±3.2, n=32) . حسب معلومات ورقة الأسئلة الإستفسارية تبين أن التعامل المؤثر وتفسير الأمراض الجنينية (٨٧.٨٥٪) كانت مفيدة لمجموعة (SGT) . كان ميول الطلاب للإستفادة من هذه الطريقة فى درس آخر ودورة أخرى (٨٦.٤٧٪) وكان (٧٨.٨٪) موافقين أن طريقة التعليم التقليدية من أجل تعلم مادة علم الأجنة هي الأفضل .

النتيجة : المناقشة الجماعية بسبب توفير التعاون والعمل الجيد والمشاركة الفعالة وزيادة التعليم أدت إلى تحسين نظرة طلاب علم التشريح . إن هذه النتيجة تؤدى إلى اقتراح أن نستفيد من هذه الإستراتيجية التعليمية فى الجامعة .

الكلمات الدليلية : مناقشات المجموعات الصغيرة ، علم الجنين ، طلاب الطب البشرى

بحث گروهی کوچک برای یادگیری درس جنین شناسی دانشجویان پزشکی

زمینه و هدف: بحث هایی وجود دارد که کدام روش آموزشی برای تدریس درس جنین شناسی مفید تر است. بحث گروهی کوچک (SGD) برای همکاری با یکدیگر، یادگیری، مهارت های فکری، تجربه و تعامل بهتر مورد استفاده قرار گرفته است.

روش: هفتاد دو دانشجوی پزشکی به طور مساوی و به طور تصادفی به بحث گروهی کوچک (SGD) (گروه اول) و آموزش معمول مبتنی بر سخنرانی (LBT) (گروه دوم) در درس جنین‌شناسی عمومی تقسیم شدند. موقعیت هر دو گروه در جنین شناسی اختصاصی تغییر کرد. پیش آزمون و دو پس آزمون (پیش دوره، میان ترم برای جنین شناسی عمومی، نهایی برای جنین شناسی اختصاصی) برای ارزیابی دانش جنین شناسی دانشجویان با استفاده از آزمون t مستقل انجام گردید. پرسشنامه ای برای جمع آوری نگرش دانش آموزان در مورد بحث گروهی طراحی شد.

یافته ها: نتایج نشان داد که میانگین نمره دو گروه در آزمون پیش آزمون تفاوت معنی داری را نشان نمی دهد. میانگین نمره گروه SGD در مقایسه با گروه LBT به طور معنی داری در درس جنین شناسی عمومی (17.9±2.2, n=33 vs. 15.3±1.1, n=35) و در جنین شناسی اختصاصی (17.5±1.2, n=31 vs. 14.3±3.2, n=32) افزایش داشت. بر اساس اطلاعات پرسشنامه، تعامل موثر و تفسیر بیماری های جنینی (٨٧.٨٥٪) برای گروه SGT مفید بود. علاقه مندی دانشجویان به استفاده از این روش در درس دیگر و در دوره دیگر (٨٦.٤٧٪) بود و آنها موافق بودند (٨٧.٨٪) که روش آموزش سنتی برای یادگیری جنین شناسی بهتر است.

نتیجه گیری: بحث گروهی با ایجاد همکاری بیشتر، عملکرد خوب، مشارکت فعال و افزایش دانش، نگرش دانشجویان آناتومی را بهبود می بخشد. نتیجه پیشنهاد می کند که ما از این استراتژی آموزشی در دانشگاه استفاده کنیم.

واژه های کلیدی: بحث گروهی کوچک، جنین شناسی، دانشجویان پزشکی

چھوٹے گروپوں میں امبریالوجی کے دروس کی پڑھائي کے لئے چھوٹے گروپوں کی تشکیل

بیک گراونڈ: تدریسی حلقوں میں اس بات کی اہمیت ہے کہ جنین شناسی یعنی ایمبریالوجی کی تعلیم کے لئے کونسی موثر روش اپنائي جائے۔چھوٹے گروپ بناکر ایک دوسرے کی مدد، آپس میں پڑھائي کرنا اور فکری مہارتیں حاصل کرنا نیز بہتر کوآرڈی نیشن کرنا بہتر طریقے سے میسر آتا ہے۔

روش: اس تحقیق میں ستر طلباء کو شریک کیا گیا اور چھوٹے گروپ تشکیل دئے گئے، ایس جی ڈی گروپ اور ایل بی ٹی گروپس میں شرکت کرنے والے طلباء کی مساوی تعداد رکھی گئي، اس طرح دونوں گروہوں کی تعلیمی کیفیت میں فرق دیکھا گیا،یعنی پری ٹسٹ اور پوسٹ ٹسٹ پرفارمنس میں فرق پایا گیا، طلباء سے حاصل شدہ ڈیٹا کا تجزیہ ٹی ٹسٹ سے کیا گیا، گروہی طرز تعلیم کے بارے میں طلباء کے نظریات جاننے کے لئے سوالنامہ بھی تیار کیا گیا تھا۔

نتیجے: اس تحقیق کے نتائج سے پتہ چلتا ہے کہ طلباء کے دو گروہوں میں کے پری ٹسٹ میں کوئي خاص فرق نہیں دیکھا گیا۔سوالنامہ کے جوابوں سے معلوم ہوتا ہے کہ ایس جی ٹی گروہ کے لئے آپسی تعاون اور جنین کی بیماریوں کی تشریح مفید واقع ہوئي ہے اور طلباء نے اس روش تدریس کو بھی پسند کیا ہے اور ان کی کارکردگي اچھی رہی ہے اور طلباء نے کہا ہے کہ دیگر موضوعات کی تدریس میں اس روش کو اپنایا جائے البتہ انہوں نے اس بات پر بھی رضایت کا اظہار کیا وہ امبریالوجی کو روایتی طریقے سے پڑھنے میں بھی کوئي مضایقہ نہیں دیکھتے ہیں۔

سفارش: گروہی لحاظ سے تعلیم حاصل کرنے سے طلباء میں باہمی تعاون بڑھتا ہے وہ بڑھ چڑھ کر تعلیمی سرگرمیوں میں حصہ لیتے ہیں اور اینالومی کے موضوع میں ان کی معلومات میں اضافہ ہوتا ہے اسی بنا پر ہم یہ سفارش کرتے ہیں کہ یونیورسٹیوں میں طبی تعلیم میں گروہی روش کو اپنایا جائے۔

کلیدی الفاظ: چھوٹے گروہوں کی تشکیل، امبریالوجی، میڈیکل طلباء

INTRODUCTION

Education and learning have changed and developed at different Iranian universities in recent decades, but lecture base was used more for education of basic medical courses (1). With the increasing number of students in our universities the conventional education does not responds to all the desired and educational needs. Thus, in our department we tried to reduce the lecture in embryology course and replace it with new educational method.

For medical students the learning of the human medical embryology as a basic science is a particular importance (2) . In our university, the embryology is educated in the first semester of school training and in most cases, students complain of how to teach this course. Medical students must acquire the necessary knowledge and experience the essential skills to reduce the birth defect and should help to improve the health of women and babies (2). Knowledge of normal and abnormal prenatal human development has provided the scientific basis to the medical student to understand the birth anomaly (3).

In the past two decades, the advance technology such as three-dimensional imaging of living organisms, scanning the living body, plastic models and plastination are widely used in anatomy education (3). Despite the many beneficial of this technology, damage associated with surgery increased by doctors and surgeons due to compromising the quality of training medical courses (4). Different methods in many medical colleges, such as group discussion, problem solving and brain storming were used for medical students to learning embryology (5, 6).

Small group teaching is a low-cost, simple, repeatable, interactive, and friendly and has important effect in learning and team working (7). More study has shown that the group discussion plays an important role in the improvement of student's communication skills, active participation in class and improve the attitudes of students toward the friends, teachers and class (8). In the group discussion, students have opportunity to working together and practice course concepts during the class-time (9).

For the success of the small group, different supplementary methods were suggested such as discussion group, brain storming, problem base learning and role playing (10). Each member must be accountable for his share of the group and is responsible for completing the assignment (11). Active participation, tasks clarification and evaluation are important for successful group (12). So, in our department this study conducted to determine whether SGT could improve attitude and the knowledge of medical embryology course in medical students in compare to the LBL.

METHODS

Consent for this study was approved by the Yasuj University of Medical Sciences in Iran and informed consent of 72 medical students in embryology course, in the second semester of the academic year 2014-2015. The first session was dedicated to the expectations from this method of teaching, preparation for the team discussions and role division of the members in the group.

Seventy two medical students were participated in this study and randomized equally to the SGD (group I) vs. usual LBT (group II) in general embryology. As shown in table 1, in systems-based embryology the position displaced for both groups.

A same pre-test were used for both group at the beginning of the term to assess the embryology knowledge of the students. Then, the SGT (n=36) was organized into permanent subgroups (for the entire term) including three equal groups of 12 students. As shown in table 2, for preparing students for each session 20 reusable learning objects (RLOs) were designed from different parts of the embryology course for both groups. Each RLOs were available before each session for the students and they were uploading by tablet and computer. Each group of SGT and LBT students attended 2 hours per week for 17 sessions for embryology course during the semester.

For the SGT in the first stage, students started in each session of two hours with MCQ quiz (10 min) test based on content of the RLOs and text book (eleventh edition of Langman's medical embryology) as individuals. The quizzes were scored and made available to the group facilitator and provided for observing student's problem to provide appropriate feedback when warranted. In the second stage, participant group ask to discuss the learning issues (60 min). During this time the team facilitator observed all members participation on issue, give explanation when the participants have problem. Team facilitator (TF) was responsible to listen to the students with designed probing questions encourage opinion during phase of free discussion in learning issues. In the third stage, each group retook second exam (15 min) and they could share information to answer the questions. The exam were scored and feedback to each team. Two exam including midterm and final exam were used respectively for general and systems-based embryology to assess the medical embryology knowledge of the SGD group compares to the LBT students. The exams were the same for both groups and included multiple choice quizzes, blank space and short answer questions. A questionnaire was designed to assess the attitude of the student about the SGD. The validity of the questionnaire was confirmed by experts' opinions, and its

Table 1. The position of student groups in embryology course

Group	General embryology		Special embryology	
Group I	SGD	assessment	LBT	assessment
Group II	LBT	assessment	SGD	assessment

Table 2. List of RLOs of embryology course

Number	Title	Size of megabyte	Length (min/sec)
2	Skeletal system	48.5	21.33
3	Muscular system	22.1	9.63
4	Body cavity	24.5	10.61
5	Cardiovascular system	74.6	32.11
7	Vascular system	58.3	26.14
8	Respiratory system	18.17	7.92
9	Digestive system	52.6	23.02
10	Urogenital system	53.8	24.12
11	Head and neck	57.6	27.13
12	Ear, eye and Integumentary System	21.3	9.41
13	Central nervous system	77.7	35.31

reliability was measured by Cronbach's alpha. This questionnaire consisted twelve items in different variable including; learning (1, 2), effective interactivity (5, 11), interest (3, 4, 7), understand the clinically relevant (6, 8), student preparation (9, 10) and RLOs support learning (12). Each question had five Likert scale responses (including 5 score from 1 to 5, Scale: 1, strongly disagree; 5, strongly agree), (table 2).

RESULTS

From 72 students in both groups 69 participants (34 from group I and 35 of group II) completed all exams and considered for data analysis. There was not a significant difference between the group I and group II in the first exam of embryology knowledge before the beginning of the course. As shown in table 3, the scores increased 51.5% (the 20 score were considered the 100% and the other scores were compared to this score) in group I (SGD) from the pretest (32%) to 83.5% to the mid exam in general embryology course. The score increase 35% from pretest to the mid exam for the general embryology course in group II (LBT). Independent t test showed the score significantly higher in group I compared to the group II in general embryology (mid exam), ($p<0.001$). In the systems- based embryology course (Table 3), the score in the group II that worked as SGD was significantly higher compared to the group I that worked as LBT ($p<0.05$).

Pre test, at the beginning of the term; mid exam, general embryology; fail, below 10; pass, above 10; Final exam, especial embryology. $^{*}p<0.001$ compared to the group II, $^{¥}p<0.05$ compared to the group I.

Analyzing data of the questionnaire demonstrated students (90%) agreed or strongly agreed the SGD was effective in learning and they (88%) agreed it was useful to improve understanding of the medical embryology. Nearly 96% of them agreed that the SGD create favorable interactivity among student and 82% were interested to use this method in next term for other course. Ninety eight (98%) agreed or strongly agreed that the use of RLOs were easy and useful for embryology learning (table 4).

DISCUSSION

Knowledge of the developmental stages during embryogenesis are the scientific basis to understand both normal and abnormal structures. Some medical colleges in Iran are young which have different problems in the infrastructures for medical students training. These colleges had experiences of the traditional lecture method for nearly two decade. In most cases in different medical schools, embryology course is presented as a lecture-based course without laboratory. In lectures based teaching in most cases bored and fatigue was seen on the faces of the students. Therefore, change of education methods for improved learning of different medical courses seemed necessary. Hence, in our department the new educational method and e-Learning support services were used for better learning of anatomy course but less attention has been for medical embryology course. It has been shown that group discussion can be done with low-cost and high beneficial (13). For this purpose, in our department space for grouping was designed with access of computer and liquid crystal display (LCD). All member group sat around a table so that, each student visible and verbal communication was clear to others members of the team. To prepare students in each session 25 numbers of

Table 3. Embryological knowledge (mean ± SD) scores in both groups

Group	Pre test	Mid exam	Fail	Pass	Final exam	Fail	Pass
Group I	6.4±2.1	16.7±5.2*	0	34	14.9±4.3	1	33
Group II	6.1±1.1	13.1±1.3	2	33	17.4±3.5¥	0	33

Table 4. The Descriptive and ANOVA Results (Scale: 1 = strongly disagree; 5 = strongly agree)

Row	Questionnaire items	Mean±SD
1	SGD is effective in learning the medical embryology	4.5±.1
2	SGD increase my understanding of medical embryology	4.4±.2
3	I prefer to have the other course with this method?	4.1±.2
4	SGD create motivation for me to participation in each session	4.7±.3
5	SGD is useful for effective interactivity among student and other colleagues	4.8±.8
6	SGD help me to interpret the congenital disease	3.8±.6
7	I prefer traditional teaching methods for learning embryology	2.6±.7
8	SGD helped me to understand the clinically relevant of embryology	4.3±.3
9	I was more prepare for each session during the term	4.5±.4
10	I was more prepare for exams	4.8±.8
11	We solve problems in our learning group	4.9±.1
12	RLO is easy to use and useful for anatomy learning	4.9±2.2

RLOs were designed from different part of embryology and were made available to students. This educational tool was free for students and they can use them whenever they like. RLOs have great benefit to learn the reuse, self-paced learning and could support student for preparing and active participation in class (14). Medical embryology has plentiful of factual content and RLOs as an information object could help the students to remembering them. So we focused on the threads of the RLOs that contain general subjects, important points and key items of each topic and these contents were supervised by our course coordinators. Other study suggested the RLOs were easy to use, low cost and is efficient to preparing the students for each session or exam (15).

Result revealed that SGD was more effective than the LBT for students to achieve higher scores in the midterm and in the final exam of medical embryology. Different factor such as improved of quality of RLOs, exam and use of clinical application in discussion group might contribute in enhanced learning and performances of the medical student in SGD. Further, the supplementary teaching materials such as, radiographic films and computerized resources were used in SGD and for self study after group teaching. We found appropriate content along with proper and short assessment in each session have important role in improving the learning of this course.

All participants studied the RLOs before each session and they were prepared for active participation in discussion group. Furthermore, our result revealed the SGD improved the interpersonal, interactivity and communicative skills that these features are very important for medical professionals. SGD has potential to create the academic environment, and provides appropriate time to share the responsibility and critical skills (16).

SGD method could generate to increase intellectual experiences and great deal communication which is impossible in a lecture hall (16). In small group teaching all student have opportunity to participate in the discussion and feedback from their view in the group and revise their position (17). The group facilitator sets out purposely clinical questions to create individual activity for participation and interaction between all of the students. Different questions of clinical cases were part of a group discussion in each session. For example, are cranial suture important in any abnormalities? A newborn infant has difficult in swallowing, what abnormalities might produce this problem? A child is born with ventricular septal defects, should you be concerned about any other abnormalities? These clinical problems solving generated more motivated for group discussion and the causes that they were interested to the clinical embryology.

SGD increase knowledge student of medical embryology course and understand the clinically relevant of human embryology. They discuss, tolerate and help each other to solve the problems via making decisions. Group session is efficient for learning, critical thinking, improve student's team work and make more satisfaction of their course. They had better interactivity and presentation with the increase of confidence.

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