

## CINEMEDUCATION – AN ADJUNCT TEACHING TOOL IN FIRST YEAR MEDICAL STUDENTS

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## ABSTRACT

**Background:** The use of movie clips or whole movies to help educate learners about bio-psycho-social-spiritual aspects of health care is called Cinemeducation. This is one of the few studies in world using this method as an adjunct teaching tool on Academic front. **Aim and Objectives:** To test the relevance and usefulness of movie clippings in teaching an academic session to first year medical students and to know if the pass percentage increases after the intervention. **Method:** In this Quase experimental 100 first year medical students were chosen for the study. An MCQ pattern pretest was conducted on a specific topic. Movie clips related to the topic latter was shown on the same topic. After this intervention a posttest was conducted. The results of the tests were analysed using Paired t test, MacNemar's tset and Chisquare test. **Results:** Statistically significant increase of 0.99  $p < 0.0001$  was obtained between Average Marks scored by the Students in the pretest (5.02 +- 1.60) and posttest (6.01+- 1.60); a Pearson's correlation analysis of the study groups showed that the entire group were positively correlated . Calculated Effect size Cohan's d was 0.612, the average of learning gains,  $g=11.8\%$ , average normalized gain (g) was 19.9% denoting moderate to high practical significance of the learning process. **Conclusion:** Cinemeducation as an adjunct tool will improve the student's academic performance.

**KEYWORDS:** Cinemeducation Academics, Effect size cohan's d , average of learning gains , average normalized gain.

## INTRODUCTION

Medical education is education related to the practice of being a medical practitioner; either the initial training to become a physician (training in medical school and internship learning), or additional training thereafter like postgraduate studies, fellowship and continuing medical education.<sup>[1]</sup>

Traditional education or conventional education refers to long-established customs that society traditionally used in schools. This mode of education mainly focused traditional teacher-centered methods and on note learning and memorization. These must be abandoned in favor of student-centered and task-based approaches to learning. Alternative education encompasses many pedagogical approaches differing from mainstream pedagogy. One Such alternative learning environment can be provided by cinemeducation.

The use of movie clips or whole movies to help educate learners about bio-psycho-social-spiritual aspects of health care is called cinemeducation.<sup>[2]</sup> Conventionally Medical education focuses predominantly on the science of medicine neglecting the arts and human relationships. Movie clips can be used as an tool in medical education

to address the importance of humanities in medical education and can be used to address various subjects such as medical ethics, doctor-patient relationship, clinical research, mental illness, and professionalism in medical school.<sup>[3]</sup>

Movies have been used in general practitioner education<sup>[4]</sup> to introduce students to mental illness and create a favorable attitude toward psychiatry.<sup>[5]</sup> They can provide opportunities to engage in difficult conversations regarding end-of-life issues,<sup>[6]</sup> it can be used as part of a medical humanities module for 1st-year medical students.<sup>[7]</sup>, as well as in various specialties as part of education for both medical students and postgraduates students. Movies can help students learn medical professionalism.<sup>[8]</sup> Cinemeducation could be efficient teaching method which is rarely studied on research basis. So, we decided to perform a study about the relevance of including movie clips as an adjuvant teaching tool in improvising academics of first year medical students.

## AIM AND OBJECTIVES

Aim of the study is to test the relevance and usefulness of movie clippings in teaching an academic session to first year medical students. Objectives are

1. To know if the pass percentage increases after the intervention
2. To know if there is an improvement in performance (marks) before and after the intervention
3. To know if there is an improvement in maximum marks obtained
4. To know if there is an improvement from lowest marks obtained
5. To know if there is improvement in specific topic.

### METHODOLOGY

The study was conducted in the department of physiology, karuna medical college. 100 first year medical students were chosen for the study after getting informed consent. This is a quase experimental study. A system with specific topics like stress related hormones and growth functions of different hormones which has to be taught to the students was chosen. These topics were taught with traditional teaching methods like lectures, blackboard teaching and PowerPoint presentations. A questioner in multiple choice questions (MCQ) pattern was framed, on these chosen topics. Students were to be assessed based on the marks they score on that portion

covered, like pass percentage, maximum marks obtained, lowest marks obtained.

The second teaching methods will include the traditional methods with Movie and documentary clippings of 2-5 minutes duration appropriate to the same chosen topics. Before the screening, a brief introduction to the movie was provided. The specific related movie clips was screened after the lectures. After covering all the topics with specific movie clips, a posttest assessment was done with MCQ pattern. The same questions were used in the pretest and posttest. Results of pretest and posttest were analyzed, to know if there was improvement in pass percentage, improvement in maximum marks obtained, improvement from the lowest marks obtained. A Lickert scaling was also obtained from the students.

### STATISTICS

Paired "t" test, unpaired "t" test Pearsons correlation analysis to be used to compare the variables between the pretest and McNemar's test and Chisquare test was used to compare the different outcomes between the pretest and post test results. posttest with the statistical significance set at p value of <0.05.

**Table 1: Comparison of mean marks between pretest group and post test group.**

Groups	N	Mean	Std. ERR	Std. Dev	95% Conf. Interval		t value	P value
Pretest	100	5.02	0.16	1.60	-1.37	-0.61	5.1141	<0.001***
posttest	100	6.01	0.16	1.60				
Mean difference= -0.99								
degrees of freedom= 99								

\*\*\*- *Highly Significant.*

**Table 2: Comparison of mean marks between pretest group and post test of girls.**

Groups	N	Mean	Std.ERR	Std. Dev	95% Conf. Interval		t value	P value
Pretest	69	4.93	0.16	1.34	-1.64	-0.83	6.0537	<0.001***
Posttest	69	6.16	0.19	1.55				
Mean difference= -1.23								
degrees of freedom= 68								

\*\*\*- *Highly Significant.*

**Table 3: Comparison of mean marks between pretest group and post test of boys.**

Groups	N	Mean	Std.ERR	Std. Dev	95% Conf. Interval		t value	P value
Pretest	31	5.23	0.37	2.08	-1.31	0.41	1.0765	0.2903 (NS)
Posttest	31	5.68	0.30	1.68				
Mean difference= -0.45								
degrees of freedom= 30								

NS- *not significant*

**Table 4: Pearsons correlation analysis of these study groups.**

	N	R value	R2 value Coefficient of determination	P value
Entire group	100	0.2682	0.0719	<0.01**
Female students group	69	0.3237	0.1048	0.3950 (NS)
Male students group	31	0.2411	0.0581	0.19135 (NS)

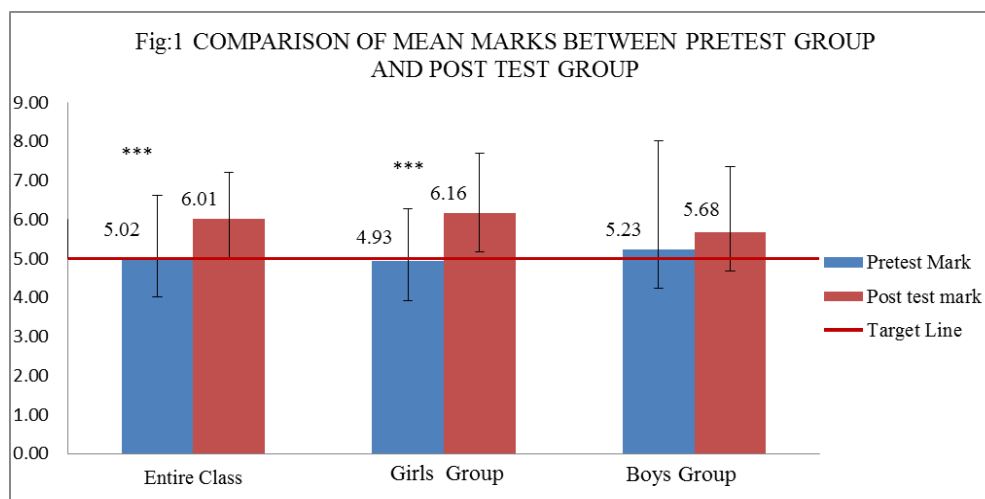


Table 5: Effect size (Cohans “d”), average normalized gain (<g>) and average of learning gain (g · x) between groups.

	EFFECT SIZE (Cohan “d”)	AVERAGE NORMALIZED GAIN ( <g> )	AVERAGE OF LEARNING GAIN ( g · X )
Entire group	-.612	19.9%	11.8%
Female students group	0.8489	24.30%	21.9%
Male students group	0.2380	9.4%	10.7%

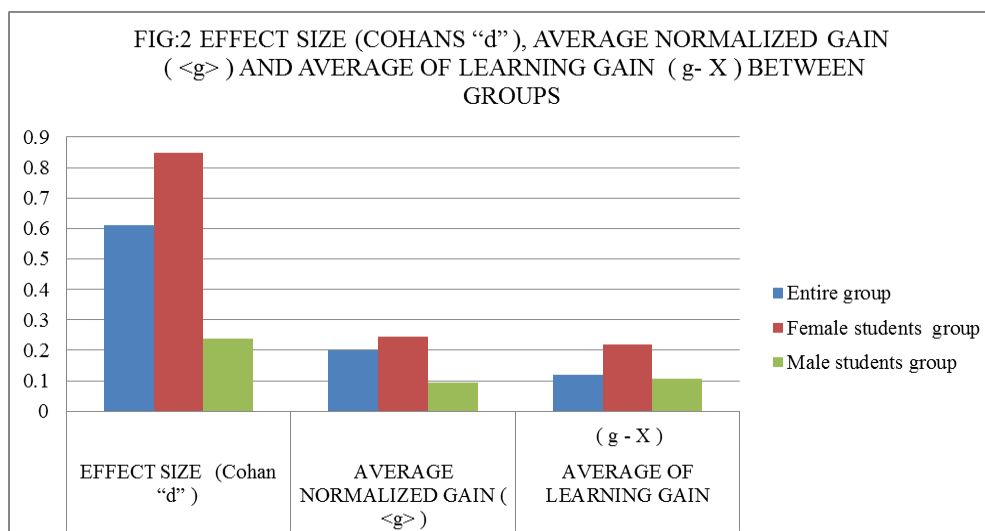
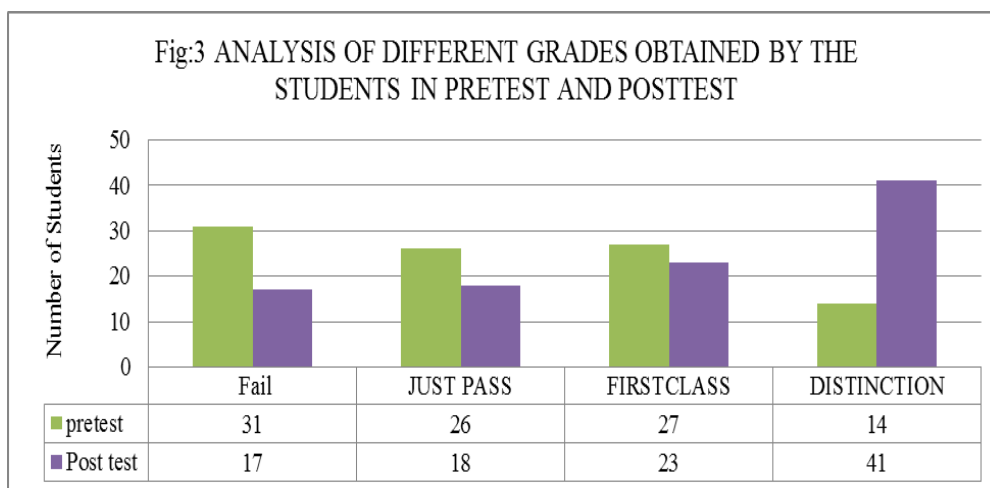


Table 6: Analysis of different grades obtained by the students in pretest and posttest.

	GRADES				
Groups	Fail	JUST PASS	FIRSTCLASS	DISTINCTION	P value
Number of students -					
pretest	31	26	27	14	<0.001***
Post test	17	18	23	41	

\*\*\*- Highly Significant.



**Table 7: Comparison of of different grades obtained by students in pretest and post test.**

Grades Number of students -	Pretest	Post test	P value
Pass (N= 100)	69	83	<0.05*
Fail	31	17	
Firstclass (N= 100)	27	23	0.6194 (NS)
Just passed	26	18	
Distinction (N= 100)	8	41	<0.001***
Just passed	26	18	
First class	27	23	0.5200 (NS)
Others who did not fail (N= 69)	43	46	
Distinction	8	41	<0.001***
Others who did not fail (N=69)	61	28	
No of students who obtained maximum marks (N= 100)	4	17	<0.05*
No of students who obtained minimum marks	17	2	

\*\*\*- **Highly Significant.** \*- **Significant.** NS- **not significant**

**Table 8: Comparison and analysis of outcomes of different grades between pretest and post test.**

	Number of students in both pretest and post test	Number of students in both pretest and post test	Number of students in pretest to post test	Number of students in pretest to post test	Odds ratio	P value
Between pass and fail	Passed in both test	Failed in both test	Passed in pretest to failed in post test	Failed in pretest to the passed in post test		
	60	3	2	3	7.667	<0.001***
Between distinction and first class	Distinction	First class	Distinction in pretest to first class in post test	First class in pretest to distinction in post test		
	7	4	6	16	0.375	0.055 (NS)
Between distinction and fail	Distinction	Fail	Distinction to fail	Fail to distinction		
	7	9	0	9		<0.01**
Between distinction and just pass	Distinction	Just pass	Distinction to just pass	Just pass to distinction		
	7	9	0	8		< 0.05*
Between First class and Fail	First class	Fail	First class to Fail	Fail to First class		

	4	9	3	7	0.429	0.3428(NS)
Between First class and Just pass	First class	Just pass	First class to Just pass	Just pass to First class		
	4	8	4	5	0.800	1.000(NS)
Between Just pass and Fail	Just pass	Fail	Just pass to Fail	Fail to Just pass		
	8	9	3	4	0.750	1.000(NS)
Between Best mark and Worst mark	Best mark	Worst mark	Best mark to Worst mark	Worst mark to Best mark		
	2	1	4	9	0.2673	0.444(NS)

\*\*\*- Highly Significant. \*\*- Moderately Significant. NS- not significant

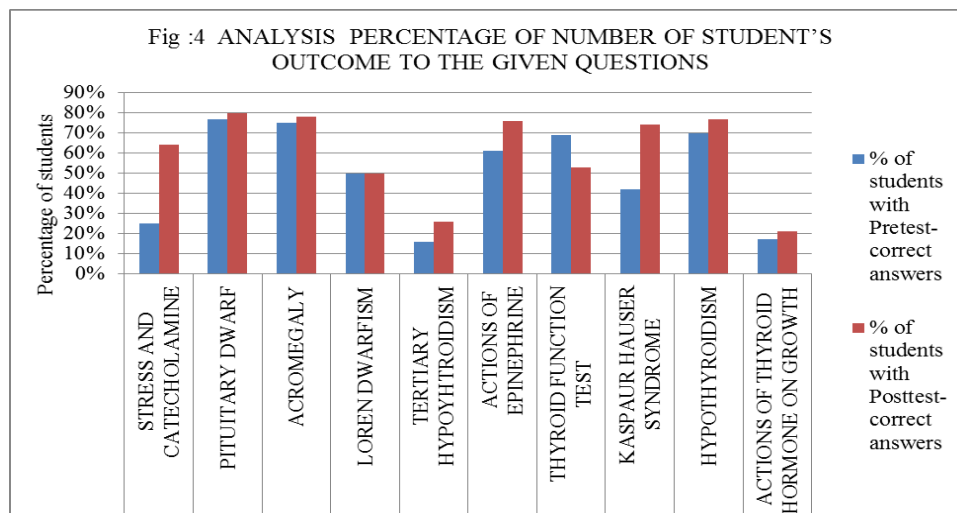
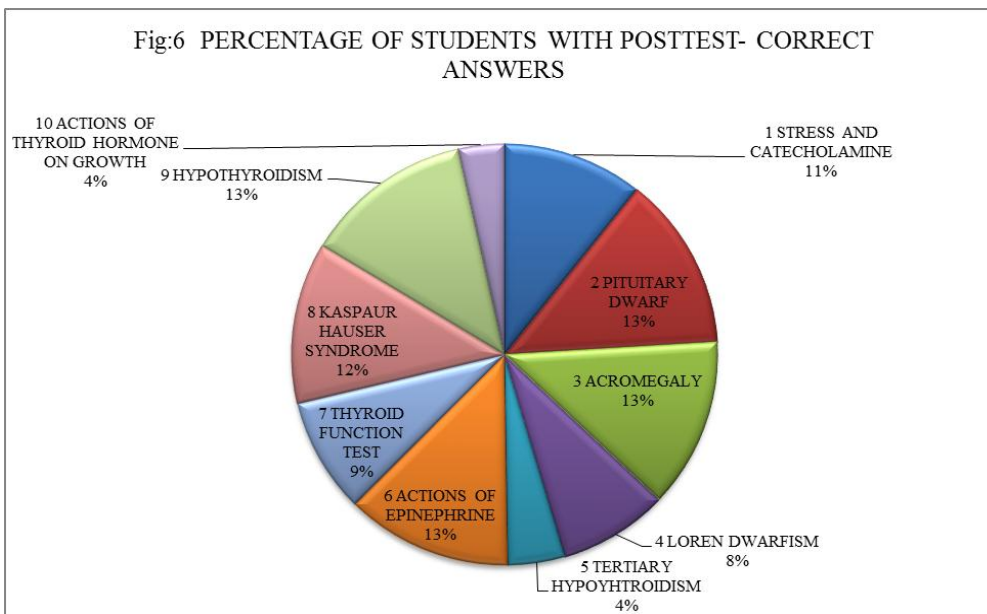
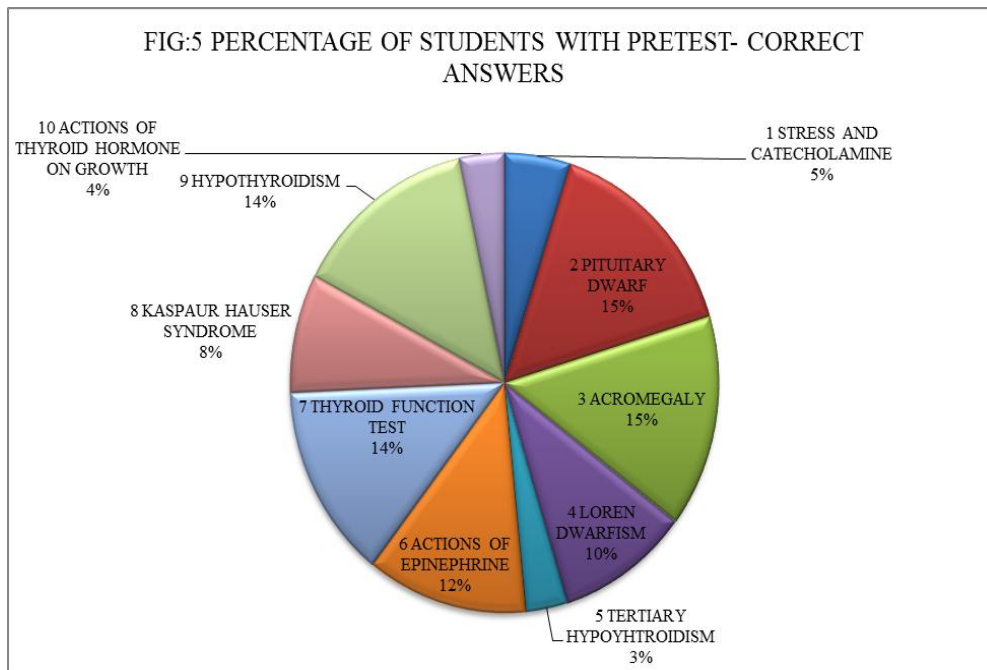


Table 9: Analysis percentage of number of student's outcome to the given questions.

Question number (Q.No)	Topic	% of students with Pretest-correct answers	% of students with Posttest-correct answers%	% of students with Pretest-wrong answers	% of students with Posttest-wrong answers	p value
1	STRESS AND CATECHOLAMINE	25 %	64%	75%	36%	<0.001***
2	PITUITARY DWARF	77%	80%	23%	20%	0.6056(NS)
3	ACROMEGALY	75%	78%	25%	22%	0.6169(NS)
4	LOREN DWARFISM	50%	50%	50%	50%	1.000(NS)
5	TERTIARY HYPOYHTROIDISM	16%	26%	84%	74%	0.0826(NS)
6	ACTIONS OF EPINEPHRINE	61%	76%	39%	24%	<0.05*
7	THYROID FUNCTION TEST	69%	53%	31%	47%	<0.05*
8	KASPAUR HAUSER SYNDROME	42%	74%	58%	26%	<0.001***
9	HYPOTHYROIDISM	70%	77%	30%	23%	0.2621(NS)
10	ACTIONS OF THYROID HORMONE ON GROWTH	17%	21%	83%	79%	0.4709(NS)

\*\*\*- Highly Significant. \*- Significant. NS- not significant



## RESULTS

A paired t test was run on a sample of 100 students to determine whether there was significant mean difference between the pass and fail percentages with a pretest and posttest results. An intervention was conducted between the tests. Students scored pretest (5.02  $\pm$  1.60); posttest (6.01  $\pm$  1.60); a statistically significant increase of 0.99 (95% CI, -1.37 to -0.61)  $t = 5.1141$ ,  $p < 0.0001$  (Table: 1, Fig:). A paired t test done among the girls group (N=69) showed pretest (4.93  $\pm$  1.34); posttest (6.16  $\pm$  1.55); there was statistically significant increase (95% CI, -1.64 to -0.83)  $t = 6.0537$ ,  $p = < 0.0001$  (Table: 2, Fig: 1). A paired t test done among the boys group (N=31) showed pretest (5.23  $\pm$  2.08); posttest (5.68  $\pm$  0.30); there was no statistically significant increase (95% CI, -1.31 to 0.41)  $t = 1.0765$ ,  $p = 0.2903$ . (Table: 3, Fig:1). Pearson's

correlation analysis of the study groups showed that the entire group, male student group and female student group were positively correlated. The entire group was significantly correlated  $p = 0.0069$ , other groups were not  $p = 0.3950$  and  $0.19135$  respectively (Table: 4, Fig: 1).

Calculated Effect size Cohan's d was 0.612, the Female students group (N=69),  $d = 0.8489$  and among male students group (N= 31) was  $d = 0.2380$ . (Table : 5, Fig: 2). We calculated the learning gain score for each individual student, the performance between the pretest and posttest and the then calculated the average of learning gains ( $g - X$ ) of the students N=100,  $g = 11.8\%$ . We also calculated the average normalized gain (g) which was 19.9%, calculations were based on the means of 2 groups. Average of learning gains of the Female students (N=



69), ( $\bar{g} \pm X$ ) 21.9% and Average normalized gain was  $\bar{g}=24.30\%$ . Average of learning gains of the Male students  $N= 31$ , ( $\bar{g} \pm X$ ) 10.7% and Average normalized gain was  $\bar{g}= 9.4\%$  (Table: 5, Fig:2)

Analysis of different grades obtained by the students in pretest and posttest done by Chisquare test of Independence showed there was significant difference between fail, Just pass, Firstclass, and Distinction groups with a p value of  $< 0.001$ . (Table: 6, Fig:3). Comparison of different grades obtained by students in pretest and post test showed there was a significant difference between the pass – fail percentages  $p= 0.0205$ ; between distinction and just pass,  $p= 0.0001$ ; and Distinction and others who did not fail,  $p= 0.0001$ . Difference between the No of students who obtained maximum and minimum marks was significantly different. (Table: 7), but between the students with Between Best mark and Worst mark ( $p= 0.444$ ) was not significantly different (Table : 7).

MacNemar test was run to do the comparison and analysis of outcomes of different grades between pretest and post test showed (Table: 8). Number of students in different grading like passing in both test, pass to fail were taken. The categories and their p value are: Between pass and fail ( $p= 0.0002$ ), Between distinction and first class ( $p= 0.055$ ), Between distinction and fail ( $p= 0.007$ ), Between distinction and just pass ( $p= 0.013$ ) showed significant alterations, but Between First class and Fail ( $p= 0.3428$ ), Between First class and Just pass ( $p= 1.000$ ), and Between Just pass and Fail ( $p= 1.000$ ), did not show significant difference.

Analysis of percentage of number of student's outcome to the given questions revealed Q.NO: 1 (Stress And Catecholamine); Q.NO: 6 (Actions Of Epinephrine); Q.NO: 7 (Thyroid Function Test); Q.NO: 8 (Kaspaur Hauser Syndrome) were answered correctly with a significant difference between the pretest and posttest with a  $p = 0.0001, 0.0224, 0.0204, 0.0001$  respectively. Other question had a better outcome but not significantly different except for the Q.NO.4 (Loren Dwarfism) where the outcome was equal before and after the intervention. (Table: 9, Fig :4,5,6).

## DISCUSSION

Interactive teaching methods using art as a teaching tool are very efficient.<sup>[9,10]</sup> Movies, for example, present developed scenarios and are a form of controlled environment, which enables reproducible, focused and independent student learning. Through art, students are able to understand patients in their whole context.<sup>[11]</sup> Cinemeducation could be efficient teaching method.

Our study population included first year medical students and certain topics taught with traditional teaching method and a pretest conducted, after which a certain movie clips and documentaries related to the topic were shown., then a post test was conducted. We framed 3

groups, one group consists of the entire students of the class ( $N= 100$ ), the second group consists of Female students ( $N= 69$ ) and the third group consists Male students ( $N= 31$ ) for analysis. A paired t test showed significant improvement among the entire students group and the Female student group after the new method of teaching, the Male student group showed an improvement which was not significantly different. Pearsons correlation analysis of the study groups showed that the entire group, male student group and female student group were positively correlated, but only the Entire study group was significantly correlated.

Effect size (cohan's  $d = 0.612$ ) of the entire study group suggest a moderate to high practical significance. Among the Female students group ( $N=69$ ),  $d= 0.8489$  suggest high practical significance and among male students group ( $N= 31$ ),  $d= 0.2380$  may suggest low significance. (Table: 5, Fig:). The learning gain score for each individual student 's average ( $\bar{g} \pm X$ ) was 11.8%, which was less than the Female student group (21.9%), who showed better response to the male students(10.7%). Average normalized gain ( $\bar{g} \pm X$ ) was 19.9%, Female group 24.30%. Than male students group with 9.4%.

Outcome of the students with different grades was significantly different. There was a significant pass percentage increase from 69 % to 83 % and a reduction in failures 31% to 17 %. Differences between the individual grading showed significant increase in distinction holders and first class passers.

Comparison and analysis of outcomes of different grades between pretest and post test showed improvement was observed Between pass and fail, Between distinction and first class, Between distinction and fail, Between distinction and just pass significantly showing mark scoring capacity was increased among the students.

We could pick out the topics were the student showed significant improvement like Stress And Catecholamine, Actions Of Epinephrine, Thyroid Function Test, Kaspaur Hauser Syndrome and other topic questions too were answered but statistically significant except for one topic where there was equal response.

Movies and theatre can provide social, anthropological, and cultural knowledge about people and in this way help to understand human life.<sup>[12,13,14]</sup> As an affective domain, they promote reflection, and link learning to experiences. Movies can teach empathetic behaviors, self-reflection, compassion, and other skills. Movies have been used in a variety of disciplines such as family medicine, psychiatry, internal medicine, and clinical pharmacology among others.<sup>[3]</sup>

Compiling and collecting various movie clipping related to the topics and usage of the appropriate topics will help students in the learning process.

## CONCLUSION

Limitation of our study was there was no control group. The study showed using Cinemeducation as an adjunct tool will improve the student's academic performance. This is one of the few studies which elaborated the influence of movie watching on academic excellence in India. This study showed the academic improvement of the students where we could pick out the topics of interest as well as of difficult zones. Hence students should be introduced to the learning objectives of the sessions which utilize movies as a teaching-learning methodology as the use of this interesting methodology is still not very common.

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