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RESEARCH ARTICLE

ASSESSING THE ROLE OF EARLY CLINICAL EXPOSURE IN ANATOMY: A PERCEPTION AND FEEDBACK

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Abstract

Introduction: As students enter, they start learning three basic science topics namely Anatomy, Physiology and Biochemistry. Exposing the students to clinical cases as early as first year assists the student to learn relevant anatomy and its importance to medical diagnosis. So the challenge is to include such a method in medical education that would enhance the clinical education quality and one such method is Early Clinical Exposure (ECE). Early Clinical Exposure (ECE) is nothing but preparing the first year MBBS students to meet and learn from the patients.

Methodology: Online case based lectures on the 2 topics of ECE were taken for phase I MBBS students of 2019-20 batch in Dr. Ram ManoharLohia Institute of Medical Sciences, Lucknow. Zoom Pro Platform was used after getting approval from Institutional Ethics Committee. For these sessions MCQ based pre and post test was designed to assess the effectiveness of case based approach rather than traditional way of teaching clinical anatomy and their feedback for the ECE was taken voluntarily on 5-pointlikert scale. Total 100 students participated in the study and the mean score of pre and post test was tabulated. Paired T Test was used to calculate the level of significance between pre and posttest of both the sessions.

Results: Analysis shows significance difference between pretest and post test scores of the students in both ECE I And ECE II (p-value 0.000). Satisfaction Index was 86% .

Conclusion: Early Clinical Exposure may be an effective technique to supplement the traditional teaching and improve the performance, knowledge and motivation due to better comprehension and correlation.

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Introduction:-

Medical education curriculum has been an important aspect of the healthcare sector. The fate of the early MBBS students, who are set to be future doctors is very much dependent on medical teaching. Students who are enrolled in

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the MBBS program need to know the basic medical science along with the clinical exposure1,2. The goal of undergraduate medical education program is to create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant. This blend of learning basic science along with clinical exposure can be achieved by introducing a patient-centred curriculum with Early Clinical Exposure3,4. Early clinical exposure is defined as a teaching and learning approach that includes real patients and their interaction with the early-stage medical students to develop a clinical context and help them learn the illness and health of the patients5. This Early clinical exposure aids the students in grasping the medical principles and enhances their clinical practice, thus leading them towards a better future doctor6. There are numerous benefits of early clinical exposure due to which it is considered an important part of teaching7. Some of the advantages are, improved counselling skills, clinical competence, early involvement in the medical environment, motivation, increased professionalism, increased growth and development, enhanced communication skills, and development of empathy towards patients1,5,8–11. Looking at the advantages listed above, ECE has been adopted worldwide in medical colleges to reduce the gap between theoretical learning and its clinical application. In 2015, the Medical Council of India (MCI) had recommended to include ECE in the syllabus of medical students 12. There have been several studies done and published to assess the impact of ECE in different branches of medical science.

In the current study, we have assessed the role of early clinical exposure in learning anatomy in medical science. We have focused on two important and common topics that are of use in the field of Anatomy i.e., Down syndrome and Inguinal hernia. We used two questionnaires on the selected topics and asked the medical students to fill them out before and after the ECE session. We then observed the knowledge increased after conducting the ECE. We also took feedback from the students to assess the role of ECE in Anatomy and how it can improve real-time patient handling and thus improve the treatment procedure.

Material and Methods:-

In this study, we randomly selected a cohort of 130 students who were enrolled inMBBS Course and studying in Phase I of 2019-20 year of Dr. Ram ManoharLohia Institute of Medical Science, Lucknow. The study was approved by Institutional Ethical committee and the ECE was conducted at the Anatomy department.

Inclusion Criteria:
The students who were willing to take part in the study were selected.

Exclusion Criteria:
Students who didn't responded.

We conducted two Early clinical exposures sessions and named them ECE-1 and ECE-2. The students were asked to fill out the questionnaires via google form before the start of the ECE session which was termed as pre ECE and then the ECE session was conducted. The students were asked to fill out the questionnaire again which we termed as post ECE after the completion of session. The questionnaire had multiple-choice questions. We also surveyed the google form of a questionnaire to assess the impact of Early clinical exposure via feedback form.

We made two questionnaires each having 10 multiple-choice questions for early clinical exposure. The first questionnaire was based on Down Syndrome and the second questionnaire was based on Inguinal hernia. The students were asked to fill out the questionnaire pre and post-ECE to check the knowledge increased. The feedback questionnaire was circulated among the students to assess the impact of ECE and to get insight into whether the students have benefited from the ECE or not.

We checked the statistical significance of both the Early clinical exposure 1 and 2 before and after the test. T-test was done to check the significance of both the ECE at a 95% confidence interval.

Results:-

The mean score of tests before and after conducting ECE-1 and ECE-2

We calculated the mean score obtained in tests before (pre-test) and after conducting (post-test) both ECE-1 and ECE-2. We found that the mean score of the test increased from 80±0.18% to 96.69±0.08% after ECE-1, while the score of the test after ECE-2 was increased from 58.92±0.23% to 91.23±0.16%. The result clearly shows the impact

of ECE on students as their mean scores increased significantly after ECE. This can be directly correlated with the increased understanding of the topic on which the ECE was conducted (Fig 1).

Segregation of students based on the scores in ECE-1 and ECE-2

When we distributed these scores in three categories wiz students scoring more than 80%, students scoring between 60% to 80% and students scoring less than 60%, we found that before the ECE-1, 54 students were scoring more than 80% score in test and the number of students was increased to 118 after conducting the ECE-1. Similarly, the number of students scoring more than 80% of the scores in tests before and after the ECE-2 was increased from 60 to 103 respectively. Earlier 66 students scored 60-80% on tests before ECE-1 and the number decreased to 11 after conducting the ECE-1, while the students in ECE-2 were reduced from 48 to 22 before and after conducting the ECE-2 respectively. There was a steep decrease in the number of students who were scoring less than 60% on tests before and after conducting the ECE. The student in ECE-1 was reduced to 1 from 10 after conducting ECE-1, while in ECE-2 the students were reduced to 5 from 22 after conducting ECE-2. From Figure 2, the number tells us that the students were scoring more after conducting both early clinical exposures.

Response of students after ECE-1 against the questionnaire

The students were given a questionnaire consisting of 10 questions to answer after the ECE-1 was conducted. The set of 10 questions was set up on Down syndrome. We observed that after ECE-1, in 8 questions more than 80% of the students answered them correctly while there were 2 questions where the frequency of the answer was around 50%. The questionnaire and the frequency of response can be seen in Table 1.

Response of students after ECE-2 against the questionnaire

We made a questionnaire consisting of 10 questions on inguinal hernia for ECE-2. The students were asked to answer the questions after the completion of ECE-2. From the answers obtained after ECE-2, we observed that more than 85% of students answered all the questions correctly. The questions used for ECE-2 and the frequency of responses can be seen in Table 2.

Significance level of ECE-1 and ECE--2 before and after conducting it.

We performed paired t-test to get the significance level of the pre and post-test results of ECE-1 and ECE-2 at 95% confidence intervals. As per the results shown in Table 2, we can deduce that there is a significant difference found in the results of pre and post-test with a significance value of 0.000. The mean difference between the test in ECE-1 is close to 0.17 with a Standard Deviation of 0.20 and in ECE-2 is close to 0.32 with a Standard Deviation of 0.28. The values show that the difference between the responses of students was very small.

Feedback questionnaire to assess the impact of ECE-1 and ECE-2

We performed a survey to assess the impact of both the ECE-1 and ECE-2 by asking questions through a questionnaire. The options were set according to a Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). Based on the responses obtained in Table 4, we observed that all the students more or less agreed or strongly agreed upon the beneficial impact of both the ECE-1 and ECE-2 conducted. We also observed a negligible population who disagreed and strongly disagreed with the ECE. We deduced that the knowledge was increased, both the ECE was interactive and well organized, and many students agreed that more such ECE should be conducted. My confidence around the subject was increased after both ECE and it helped in understand the subject better.

Satisfaction Index came out to be 86%.

Discussion:-

In the current study, we have assessed the role of Early clinical exposure on early medical students. For the same, we selected two topics i.e., Down syndrome and Inguinal hernia. We designed the questionnaires on each topic consisting of 10 questions each. We found that the basic knowledge of students on the selected topic increased after the early clinical exposure. This finding was evident from the results as we can see in figure 1 and 2. The mean score of students increased after the ECE and there was around a 50 percent increase in population scoring 80% and above after the ECE. The feedback from students also confirmed that the students were more confident about the topics after the early clinical exposure. The medical students were highly involved in the sessions making it more interactive and fruitful. They also affirmed that more such sessions should be conducted to enhance the knowledge on different topics. The sessions developed more confidence in them about the topic and the sessions were beneficial for understanding the subject. They also provided crucial feedback about improvements; the teachers should make to

make this learning procedure more beneficial to students. Our findings fulfill the purpose of early clinical exposure which is building confidence among the students and motivating them. The involvement of patients improves their communication skills, patients' empathy, and job professionalism9,13. Several studies report the importance of early clinical exposure for first- or second-year medical students. A study conducted by Gupta K et.al. and his team revealed that the ECE enhanced the knowledge of the students and helped them understand the importance of preclinical subjects in clinical setup14. There are some other study too which say that ECE enhances the logical and reasoning skills of the students15. ECE improves the learning of basic medicine along with clinical exposure16. As a result of the findings by various research groups, universities all around the globe have tried to implement Early clinical exposure as a part of their curriculum. This step has proved a critical step in the learning procedure of medical students giving them adequate exposure to clinical learning. This clinical learning aids them in becoming a better future doctor.

Conclusion:-

There have been multiple studies which have been conducted by the groups to assess the role of early clinical exposure on early medical students. The advantages it serves to students have been listed in the articles thereby making it an important part of the curriculum. In the current study, we have investigated the impact of early clinical exposure on medical students studying anatomy. The ECE was conducted, and a questionnaire was filled by the students before and after the ECE. The answers obtained from questionnaires before and after the early clinical exposure tell us the positive impact of it. It is evident from the results that the knowledge of the students about the subject has significantly increased after early clinical exposure. There were significant differences in the percentage of correct answers before and after the clinical exposure conducted. The number of students scoring above 80% after the ECE increased while the students scoring less than it was decreased showing a shift in students from scoring low to high. The same results were verified by calculating the significance level of the ECE. This shows that the understanding of the students concerning both subjects increased significantly after the ECE. The feedback questionnaire confirmed this finding, as students themselves admitted the positive impact of the early clinical exposure.

Tables and Figures

Table 1:- Questionnaire on Down Syndrome and the frequency of options opted by students after ECE-1.

Category	Sub-Category	Frequency	Percent
1. The number of chromosomes in a child with Down Syndrome is	47	123	95%
	46	6	5%
	45	1	1%
	Total	**130**	**100%**
2. One of this traits is not seen in a person with Down Syndrome	High muscle tone	115	88%
	Upward slant eye	9	7%
	Short neck	3	2%
	Small stature	3	2%
	Total	**130**	**100%**
3.This assessment finding would enable a nurse to suspect the presence of Down syndrome in a new-born	Single palmar crease and hypotonia	117	90%
	Prominent scalp veins and a high-pitched cry	5	4%
	Persistent postnatal growth lag and Microcephaly	3	2%
	Short palpebral tissues and flat maxillary area	5	4%
	Total	**130**	**100%**
4. Which of these traits is not linked with Down syndrome?	Oily skin	104	80%
	Hypotonicity	10	8%
	Brachycephaly	14	11%
	Simian Crease	2	2%
	Total	**130**	**100%**
5. A disease which may result from Down syndrome	Celiac disease	65	50%
	Cellulitis	27	21%
	Cancer	21	16%
	None of these	17	13%
	Total	**130**	**100%**

6. Generally, a person with Down syndrome has an IQ of	20-30	48	37%
	40-50	71	55%
	60-70	9	7%
	80-90	2	2%
	Total	**130**	**100%**
7. The chances of an offspring to have Down syndrome with the mother's age	Increases	118	91%
	Decreases	4	3%
	is not influenced	6	5%
	there is no correlation	2	2%
	Total	**130**	**100%**
8. There are several variations of Down syndrome with Trisomy 21 accounting for close to 95% of all cases recorded.	Translocation	114	88%
	Transportation	4	3%
	Displacement	8	6%
	Relocation	4	3%
	Total	**130**	**100%**
9. Down Syndrome may be diagnosed via	All of the above	101	78%
	Chromosomal Karyotype	25	19%
	Amniocentesis	4	3%
	Total	**130**	**100%**
10. Identify the karyotype with Down Syndrome	Option 1	3	2%
	Option 2	12	9%
	Option 3	112	86%
	Option 4	3	2%
	Total	**130**	**100%**

Table 2:- Questionnaire on inguinal hernia and the frequency of options opted by students after ECE-2.

Category	Sub-Category	Frequency	Percent
1. A 10-year-old boy presents a smooth swelling near the superficial inguinal ring, which moves downwards when the testicle is pulled. Diagnosis:	Indirect inguinal hernia	126	97%
	Congenital hydrocele	4	3%
	Total	**130**	**100%**
2. All are true about an inguinal hernia except	the superficial ring is an opening in the external oblique aponeurosis	7	5%
	the deep ring is an opening in the trans versus abdominals	113	87%
	the conjoined tendon forms a part of the posterior wall	6	5%
	internal oblique forms a part of the anterior and posterior wall	4	3%
	Total	**130**	**100%**
3. All the following are contents of the inguinal canal except	iliohypogastric nerve	121	93%
	round ligament	4	3%
	ilioinguinal nerve	4	3%
	spermatic cord	1	1%
	Total	**130**	**100%**
4. A patient operated for direct inguinal hernia developed sensory loss at the root of the penis and adjacent part of the scrotum. The nerve most likely to have injured is	ilioinguinal nerve	8	6%
	genital branch of genitofemoral nerve	7	5%
	iliohypogastric nerve	113	87%
	femoral branch of genitofemoral nerve	2	2%
	Total	**130**	**100%**
5. The landmark used to differentiate between an inguinal and femoral hernia is	pubic tubercle	125	96%
	pubic symphysis	2	2%

	femoral artery	2	2%
	inferior epigastric artery	1	1%
	Total	**130**	**100%**
6. Which of the following does not form the boundary of Hasselbach's triangle	vas deferens	121	93%
	rectus abdominis	6	5%
	inguinal ligament	2	2%
	inferior epigastric artery	1	1%
	Total	**130**	**100%**
7. The most common type of congenital hernia is the	direct inguinal hernia	126	97%
	para-umbilical hernia	2	2%
	femoral hernia	2	2%
	Total	**130**	**100%**
8. True statement is	a femoral hernia is more common on the right side	2	2%
	both a and b	114	88%
	an indirect hernia is more common on the right side	10	8%
	None	4	3%
	Total	**130**	**100%**
9. The processusvaginalis remains patent in of newborn infants	10%	3	2%
	20%	9	7%
	50%	2	2%
	80%	116	89%
	Total	**130**	**100%**
10. During surgery of a hernia, the sac of a strangulated intestinal hernia should be opened at the:	Fundus	116	89%
	Neck	7	5%
	Body	3	2%
	Deep ring	4	3%
	Total	**130**	**100%**

Table 3:- Significance level of ECE-1 and ECE-2 pre and post-test.

Paired Samples Test								
Pre and Post-test	Mean	Std. Deviation	Std. Error Mean	Paired Differences		t	df	Sig.
				95% Confidence Interval of the Difference				
				Lower	Upper			
ECE-1 Pre-Test% & ECE-1 Post-Test%	0.17	0.20	0.02	-0.20	-0.13	9.348	129	0.000
ECE-2 Pre-Test% & ECE-2 Post-Test%	0.32	0.28	0.02	0.37	0.27	13.132	129	0.000

Table 4:- Feedback questionnaire and the responses obtained by students after completion of both ECE-1 and ECE-2.

Respondents Point of View		Frequency						%					
	Gender	SD	D	N	A	SA	Total	SD	D	N	A	SA	Total
1. Your Knowledge increased post session	Male	0	1	0	33	36	70	0%	1%	0%	33%	36%	70%
	Female	0	0	1	15	14	30	0%	0%	1%	15%	14%	30%
	Total	0	1	1	48	50	100	0%	1%	1%	48%	50%	100%
2. More such sessions should be conducted	Male	2	0	1	27	40	70	2%	0%	1%	27%	40%	70%
	Female	0	0	0	16	14	30	0%	0%	0%	16%	14%	30%
	Total	2	0	1	43	54	100	2%	0%	1%	43%	54%	100%

3. Session was interactive	Male	1	0	3	35	31	70	1%	0%	3%	35%	31%	70%
	Female	0	0	1	19	10	30	0%	0%	1%	19%	10%	30%
	Total	1	0	4	54	41	100	1%	0%	4%	54%	41%	100%
4.Session was well organized	Male	1	0	1	33	35	70	1%	0%	1%	33%	35%	70%
	Female	0	0	1	17	12	30	0%	0%	1%	17%	12%	30%
	Total	1	0	2	50	47	100	1%	0%	2%	50%	47%	100%
5. Involvement in session was high	Male	1	0	6	40	23	70	1%	0%	6%	40%	23%	70%
	Female	0	1	4	17	8	30	0%	1%	4%	17%	8%	30%
	Total	1	1	10	57	31	100	1%	1%	10%	57%	31%	100%
6.Session developed more confidence on the topic discussed in the session	Male	1	0	3	31	35	70	1%	0%	3%	31%	35%	70%
	Female	0	1	2	15	12	30	0%	1%	2%	15%	12%	30%
	Total	1	1	5	46	47	100	1%	1%	5%	46%	47%	100%
7.Session was valuable for your understanding of the subject	Male	1	0	2	31	36	70	1%	0%	2%	31%	36%	70%
	Female	0	0	2	16	12	30	0%	0%	2%	16%	12%	30%
	Total	1	0	4	47	48	100	1%	0%	4%	47%	48%	100%
8. Teacher received adequate feedback of your work	Male	1	0	3	34	32	70	1%	0%	3%	34%	32%	70%
	Female	0	0	3	14	13	30	0%	0%	3%	14%	13%	30%
	Total	1	0	6	48	45	100	1%	0%	6%	48%	45%	100%
9. Teacher explained the conduction process adequately	Male	1	1	1	26	41	70	1%	1%	1%	26%	41%	70%
	Female	0	0	1	14	15	30	0%	0%	1%	14%	15%	30%
	Total	1	1	2	40	56	100	1%	1%	2%	40%	56%	100%

Figures

Figure 1:- Mean score of tests before and after conducting ECE-1 and ECE-2.

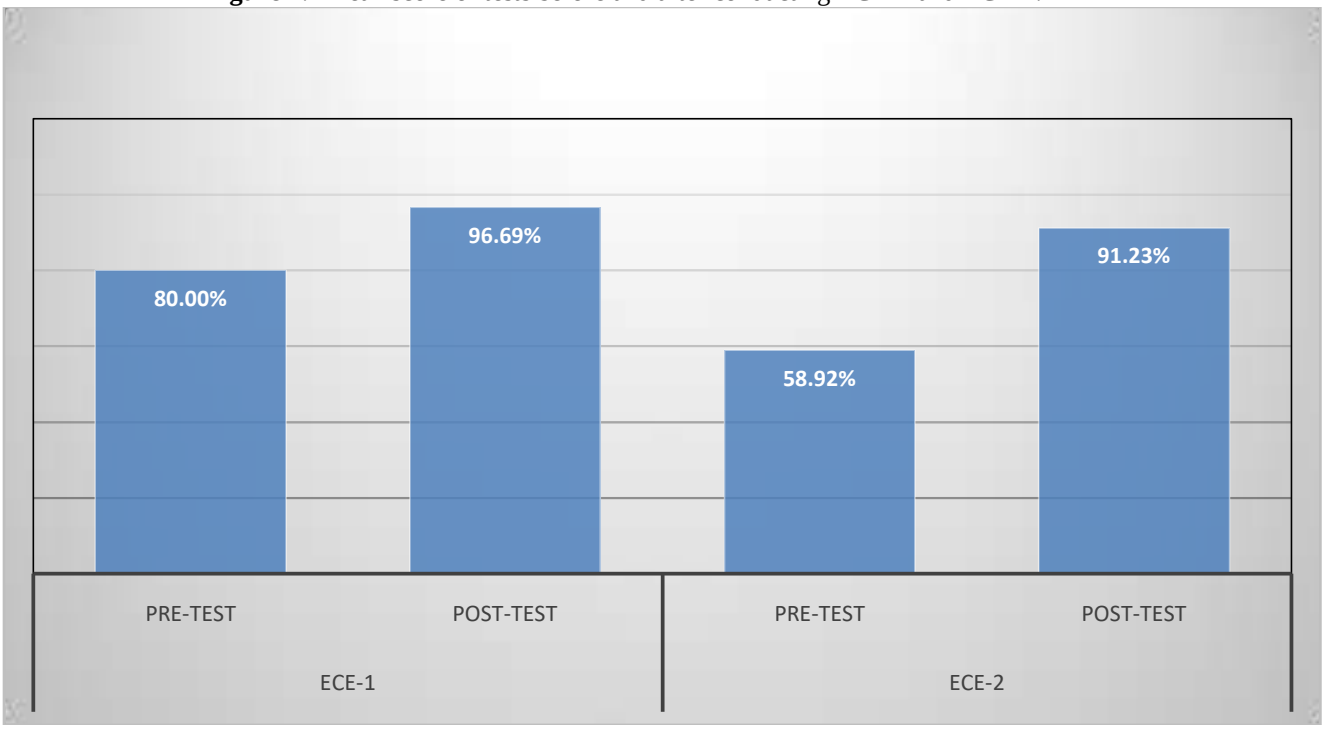
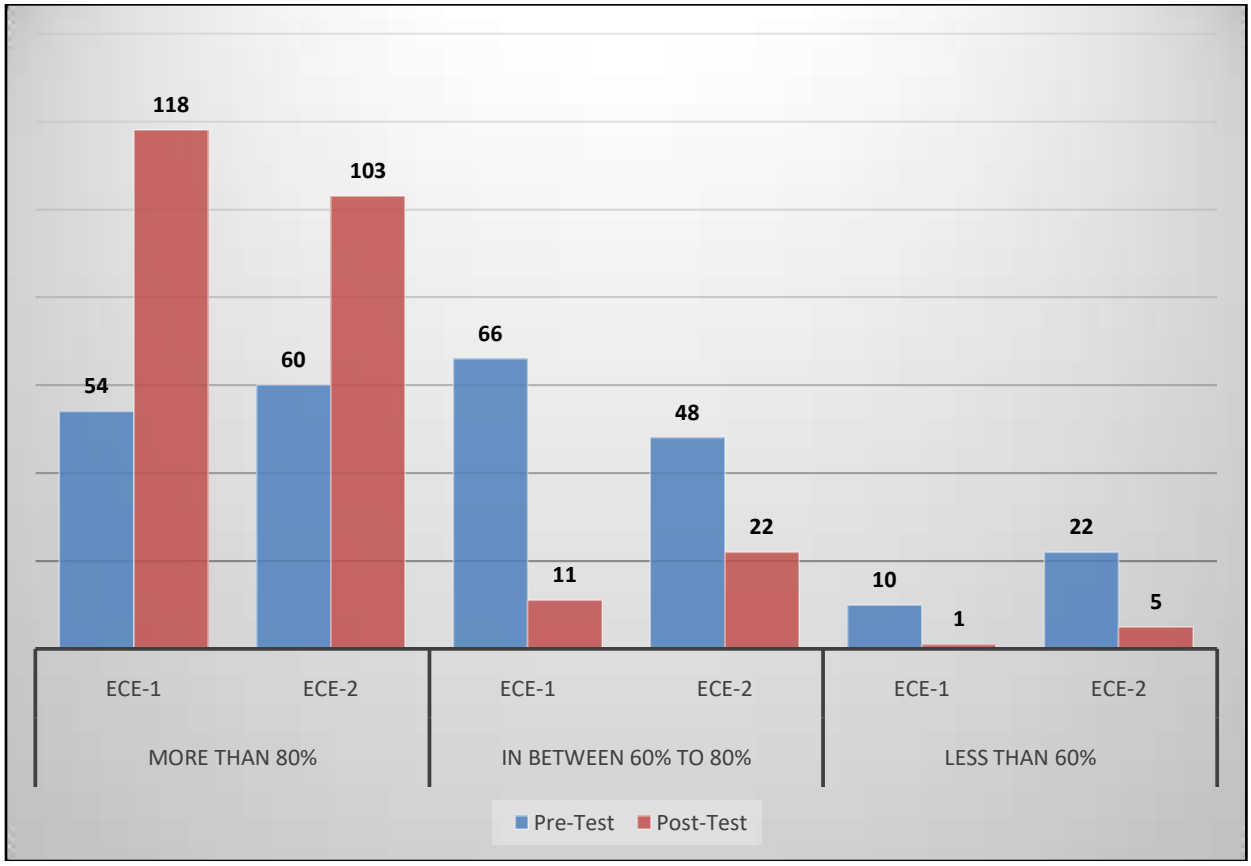


Figure 2:- Number of students scoring in 3 categories (>80%, 80% to 60%, <60%) after the completion of both ECE-1 and ECE-2.



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