"A Study To Evaluate The Effectiveness Of Flipped Classroom Teaching Method On Knowledge Regarding Ventilator Associated Pneumonia Among Undergraduate Nursing Students In Selected Colleges At Sasaram, Bihar".

Khundrakpam Sarita Devi[1], Rohit Kumar Singh[2]*, Siddharth Kumar[3], Sanjeev Kumar[4], Abya Mehta[5] and Simpi Kumari[6]

B.Sc. Nursing 4th Year students [(2,3,4,5,6)], Asst. Proff. Child Health Nursing[6].

Narayan Nursing College, GNSU, Jamuhar, Sasaram.

***Correspondence author**

Rohit Kumar Singh, B.Sc. Nursing Student 4th Year, NNC, GNSU, email id- rr9122022499@gmail.com

ABSTRACT

Introduction- A Flipped classroom teaching method is a student centred-approach where the students actively participate in classroom. Here, the instructor plays the role of a facilitator, motivator, a guide, and offers instant feedback on students' performance. In flipped classroom, the students don't have to listen long boring lectures in the classroom, but will get much more time and opportunity to find a solution to problem independently or collaborative Lee through correspondence learning with peers. In addition to the increase in complexity of the healthcare environment, and the rapid advancement of competing healthcare technology, a global pandemic emerged caused by COVID-19.

Methodology- The current study is true experimental research design and the sample size 60 study participants (30 experimental group and 30 control group) were selected through the simple randomized (lottery method) sampling technique to select the undergraduate B.Sc. 1st semester Nursing students. Data collected by the face-to-face interview method, by using self-structured questionnaire to collect the sample. Data analysed by the using of descriptive inferential statistic and paired 't' test, and, chi-square test to find the association between the pre-test and post-test and selected demographic profiles regarding the VAP.

Results- This study displays that during experimental group out of 30 study participants majority 19 (63.3%) had average knowledge, 8(26.7%) were of poor knowledge and, 3(10%) were of good knowledge during the pre-test knowledge. After that the Flipped classroom teaching and Case scenario the experimental group post-test knowledge, 25(83%) were had excellent knowledge and, 5 (16.7%) had good knowledge regarding the ventilator associated pneumonia among undergraduate nursing students in respectively. Control group out of 30 participants, 19 (63.3%) had poor knowledge, and 11 (36.7%) had average knowledge score during pre-test knowledge and after that the administration of traditional teaching method the post-test score, half of study participant, 17(56.7%) had average knowledge, 8(26.7%) had good knowledge, 4(13.3%) had poor knowledge and least 1 (3.3%) had adequate knowledge aboutVAP on undergraduate nursing students. The score of mean in experimental group during mean post-test knowledge (17.43+1.94) was greater than the mean pre-test knowledge score (8.3+2.55) in control group the mean post-test knowledge score (10+3.15) was greater than the mean pre-test knowledge score (6.13+1.97).

Discussion and conclusion- The study revealed that the flipped teaching method and case scenario had improve the students' knowledge regarding the VAP rather than the traditional teaching method. Therefore, the mean score in experimental group during mean post-test knowledge (17.43+1.94) was higher than the mean pre-test knowledge score (8.3+2.55). in control group the mean post-test knowledge score (10+3.15) was greater than the mean pre-test knowledge score (6.13+1.97).

Keyword-*Flipped Teaching, Case Scenario, VAP, traditional teaching method.*

1. INTRODUCTION

The flipped classroom method is a educational approach that shifts direct instruction from the group learning environment to the individual learning environment. By doing so, the group learning space is transformed into an interactive, dynamic environment where the educator guides students as they apply concepts and engage creatively. The flipped classroom is a student-centered learning method that consists of two parts: interactive learning activities during lessons and individual teaching based directly on the computer outside of lessons.

The flipped teaching method allows teachers to act as facilitators and contact time among teachers and students. In a flipped classroom, teacher lectures are provided to students in the form of videos that are watched by students before class. Additionally, students are required to study educational materials before attending class. With this method, students do not have to listen to long, tedious lectures in the classroom but instead have more time and opportunities to solve problems independently or collaboratively through correspondence learning with peers. As a result, valuable class time is spent on active learning activities, problem-solving, evidence-based learning, group discussion, and knowledge application, analysis, and synthesis.

Mechanical ventilation is a crucial intervention for patients experiencing respiratory failure or critical illness. Patients on mechanical ventilation are at a higher risk of developing complications such as nosocomial infections and VAP. Pneumonia refers to the inflammation of lung parenchyma caused by infection, while VAP specifically refers to bacterial pneumonia that occurs in patients who have been mechanically ventilated for over 48 hours. VAP is a common ICU-acquired infection, with reported incidences ranging from 5% to 40% depending on the setting and diagnostic criteria. VAP not only prolongs the duration of mechanical ventilation and ICU stay but is also associated with a significant increase in mortality rates, particularly in surgical ICU patients, where the estimated attributable mortality is around 10%.

The study's objective was to evaluate the effectiveness of the flipped teaching method among nursing students in terms of their basic knowledge about VAP. The research hypothesis was that the flipped classroom teaching method would increase students' knowledge about VAP.

2. METHODOLOGY

Research design and setting

The current investigation constituted a genuine experimental research endeavour, comprising an experimental and control group configuration, to evaluate the efficacy of flipped teaching alongside the traditional pedagogical methodology, with respect to the VAP competency among the B.Sc. Nursing students. Study conducted between January 2nd and February 2nd, 2024, at Narayan Nursing College.

Sample and Technique

The use of simple random sampling was employed to select a sample of 60 participants, comprising 30 individuals in the experimental group and 30 in the control group, with the aim of evaluating the efficacy of a particular method of teaching.

Participants of study

Students who are studying in B.Sc. Nursing 1st semester, Those students whoare interested in the study. Students who are sick. Students those are exposed to any teaching programme related to VAP in the past, During the study those students who are absent, Students who don’t cooperate during study are included from the study.

Description of tool

The instrument was divided into two sections. The first section comprised items related to socio-demographic variables, such as age, gender, caste, marital status, family type, area of living, and highest level of education. The second section featured a structured questionnaire that evaluate theknowledge regarding VAP among undergraduate students. Itincludes20 multiple-choice questions that covered definitions, causes, risk factors, signs and symptoms, complications, treatment, and preventive measures of VAP. Every question had4 options, with one being correct, and each correct answer was awarded one mark, while a wrong answer received no marks.

Ethical consideration

Ethical considerations were obtained from the Institutional Ethics Committee of Narayan Nursing College, Sasaram. The purpose and protocol of the study were presented to the participants, ensuring voluntary involvement, anonymity, and data confidentiality for study participants.

3. RESULTS

Table-1 Showing Socio-demographic variables

(n=60)

Socio demographic	**Frequency & percentage for Experimental group**	**Frequency & percentage for control group**
1. Age 17-19 years 20-22 years	 19 (63.3%) 11 (36.7%)	 26 (86.7%) 4 (13.3%).
2. Gender Male Female	 16 (53.3%) 14 (46.7%)	 13 (43.3%) 17 (56.7%)
3. Caste Hindu Muslim Christian Others	 29(96.7%) 1 (3.3%)	 29(96.7%) 1 (3.3%)
4. Marital status Married Unmarried Divorced Widow	 30 (100%)	 2 (6.7%) 28 (93.3%)

5. Family type Nuclear Joint Separated	 16 (53.3%) 14 (46.7%)	 16 (53.3%) 12 (40%) 2 (6.7%)
6. Area of living Urban Rural Semi urban	 14 (46.7%) 12 (40%) 4 (13.3%)	 16 (53.3%) 12 (40%) 2 (6.7%)
7. Family income per month <10000 10001 to 30000 30001 to 50000 >50000	 9 (30%) 11 (36.7%) 5 (16.7%) 5 (16.7%)	 7 (23.3%) 12 (40%) 6 (20%) 5 (16.7%)
8. Highest level of Qualification 10th /SSLC +2/PUC Diploma Degree	 1 (3.3%) 16 (53.3%) 13 (43.3%)	 1 (3.3%) 17 (56.7%) 1 (3.3%) 11 (36.7%)
9. Board of 12th State Board Matriculation CBSE ICSE	 19 (63.3%) 1 (3.3%) 10 (33.3%)	 17 (56.7%) 11 (36.7%) 2 (6.7%)
10. Medium of language at 12th Hindi English Bhojpuri	 14 (46.7%) 16 (53.3%)	 12 (40%) 18 (60%)

others		

Table 2: Showing mean and standard deviation, paired "t" value of study participants as per mean pre-test knowledge score and post-test knowledge score;

(N=6)

	Knowledge score	Mean score	Standard deviation	Df	Paired "t" value	P-value
Experimental group	**Pre-test**	8.30	2.535	29	19.571	0.0001**
	Post-test	17.43	1.194			
Control group	**Pre-test**	6.13	1.978	29	5.855	0.0001**
	Post-test	10.0	3.151			

The information in Table 2 shows that the mean post-test knowledge score for the experimental group was higher than the pre-test score, with a mean post-test score of 17±1.194 compared to a pre-test score of 8.30±2.535. The paired "t" value comparison was 19.571, with df of 29, and the p-value for this comparison was significant at 0.0001, which is less than the normal p-value of <0.05. Similarly, for the control group, the mean post-test knowledge score was higher than the pre-test score, with a mean post-test score of 10±3.151 compared to a pre-test score of 6.13±1.978. The paired "t" value comparison was 5.855, with df of 29, and the p-value for this comparison was also significant at 0.0001, which is less than the normal p-value of <0.05. Therefore, the study concluded that the null hypothesis (H0) was rejected and the research hypothesis (H1) was accepted. It can be inferred that the flipped classroom teaching method was proven to be highly effective in improving the knowledge of undergraduate nursing students regarding VAP.

Table-3: Chi-square showing the association between flipped classroom teaching methods pre-test knowledge score and selected demographic variables.

(N=60)

Socio-demographic	Flipped Classroom Teaching (Experimental)						Chi-sq.	Df	p-value
	Poor		Average		Good				
	F	%	F	%	F	%			
1. Age									
A. 17-19 years	4	21.1	13	68.4	2	10.5	0.8	2	0.65

B. 20-22 years	4	36.4	6	54.5	1	9.1	3		
2.Gender									
A. Male	4	25	11	68.8	1	6.3	0.67	2	0.71
B. Female	4	28.6	8	57.1	2	14.3			
3.Religion									
A. Hindu	8	27.6	18	62.1	3	10.3	0.59	2	0.74
C. Christian	0	0	1	100	0	0			
4. Marital status									
B. Unmarried	8	26.7	19	63	3	10	-	-	-
5. Family type									
A. Nuclear	5	31.3	9	56.3	2	12.5	0.75	2	0.68
B. Joint	3	21.4	10	71.4	1	7.1			
6. Area of living									
A. Urban	2	14.3	10	71.4	2	14.3	3.08	4	0.54
B. Rural	5	41.7	6	50	1	8.3			
C. Semi-urban	1	25	3	75	0	0			
7. Family income per month									
A. <10000	1	11.1	7	77.8	1	11.1	3.72	6	0.71
B. 10001-30000	4	36.4	6	54.5	1	9.1			
C. 30001-50000	1	20	4	80	0	0			
D. >50000	2	40	2	40	1	20			
8. Highest level of qualification									
A. 10^{th}/SSLC	1	100	0	0	0	0	4.17	4	0.38
B. +2/PUC	5	31.3	9	56.3	2	12.5			
D. Degree	2	15.4	10	76.9	1	7.7			
9. Board of 12th									
A. State Board	7	36.8	11	57.9	1	5.3	3.94	4	0.41
B. Matriculation	0	0	1	100	0	0			
C. CBSE	1	10	7	70	2	20			
10. Medium of language at 12th									
A. Hindi	7	50	7	50	0	0	8.7	2	0.01*

B. English	1	6.3	12	75	3	10	2		*

Table 3 indicates a significant correlation between pre-test knowledge scores and certain demographic variables such as medium of language at 12th, with a p-value of less than 0.05. However, there was no significant association between pre-test knowledge scores and selected demographic variables, including age, gender, caste, marital status, area of living, family income, types of family, highest level of qualification, and board of 12th, with p-values greater than 0.05, during the flipped method of teaching regarding VAP among undergraduate nursing students.

Table-4: Chi-square showing the significant association between traditional method pre-test knowledge score with demographic characteristics.

Socio-demographic	**Traditional Classroom Teaching (Control)**				**Chi-sq**	**Df**	**p-value**
	Poor		**Average**				
	F	**%**	**F**	**%**			
1. Age							
A. 17-19 years	17	65.4	9	34.6	0.35	1	0.55
B. 20-22 years	2	50	2	50			
2.Gender							
A. Male	8	61.5	5	38.5	0.32	1	0.85
B. Female	11	64.7	6	35.3			
3.Caste							
A. Hindu	18	62.1	11	37.9	0.59	1	0.43
B. Muslim	1	100	0	0			
4. Marital status							
A. Married	1	50	1	50	0.16	1	0.68
B. Unmarried	18	64.3	10	35.7			
5. Family type							
A. Nuclear	7	43.8	9	56.3	5.86	2	0.05*
B. Joint	10	83.3	2	16.7			
C. Separated	2	100	0	0			
6. Area of living							
A. Urban	5	50	5	50	1.20	3	0.75
B. Rural	11	68.8	5	31.3			
C. Semi-urban	3	75	1	25			
7. Family income per month							

A. <10000	4	57.1	3	42.9	8.40	3	0.03
B. 10001-30000	10	83.3	2	16.7			
C. 30001-50000	1	16.7	5	83.3			
D. >50000	4	80	1	20			
8. Highest level of qualification							
A. 10^{th}/SSLC	0	0	1	100	7.84	3	0.04
B. +2/PUC	9	52	8	47.1			
C. Diploma	0	0	1	100			
D. Degree	10	90.9	1	9.1			
9. Board of 12th							
A. State Board	13	76.5	4	23.5	2.93	2	0.23
B. CBSE	5	45.5	6	54.5			
C. ICSE	1	50	1	50			
10. Medium of language at 12th							
A. Hindi	2	50	2	50	2.93	2	0.23
B. English	13	50	13	50			

**denote significant

Table 4 indicates an association between pre-test knowledge score and certain demographic variable such as family income, types of family, highest level of qualification, p-value less than (0.05). However, there was no association between pre-test knowledge score and demographic characteristics including age, gender, caste, marital status, area of living, board of 12th, medium of language at 12th, p-value greater than (0.05) during the traditional method of teaching regarding the VAP among undergraduate nursing students.

4. DISCUSSION

The outcomes indicate that the mean post-test knowledge score for the experimental group (17±1.194) was higher than the pre-test knowledge score (8.30±2.535). The paired "t" value comparison was 19.571, with df of 29, and the p-value for this comparison was significant (0.0001), which is less than the normal p-value (<0.05). On the other hand, for the control group, the mean post-test knowledge score (10±3.151) was higher than the pre-test knowledge score (6.13±1.978). The paired "t" value comparison was 5.855, with df of 29, and the p-value for this comparison was significant (0.0001), which is less than the normal p-value (<0.05). Thus, the study concluded that the null hypothesis (H0) was rejected, and the research hypothesis (H1) was accepted. The flipped classroom teaching method was proven to be significantly effective in improving the knowledge of undergraduate nursing students regarding ventilator-associated pneumonia. A significant association was found between the pre-test knowledge score and certain demographic variables, such as the medium of instruction at the higher education level, with a p-value less than (0.05). No significant association was found between the pre-test knowledge score and selected demographic variables, such as age, gender, caste, marital status, area of living, family income, types of family, highest level of qualification, board of 12th, and medium oflanguage at 12th, with a p-value greater than (0.05) during the flipped method of teaching regarding

VAP among undergraduate nursing students. A significant association was found between the pre-test knowledge score and certain demographic variables, such as family income, types of family, and highest level of qualification, with a p-value less than (0.05). No significant association was found between the pre-test knowledge score and selected demographic variables, such as age, gender, caste, marital status, area of living, board of 12th, and medium of language at 12^{th}, with a p-value greater than (0.05)during the traditional method of teaching regarding the VAP among undergraduate nursing students.

5. CONCLUSION

The flipped classroom is an innovative educational approach that relocates direct instruction from the group learning environment to the individual learning environment. By doing so, the group learning space is transformed into a dynamic and interactive learning area where the educator facilitates the students' application of concepts and creative engagement with the subject matter. Despite advancements in medical technology, VAP continues to complicate the treatment of 8-28% of patients receiving mechanical ventilation. In contrast to infections that affect less vital organs, such as the urinary tract and skin, which have low mortality rates ranging from 1% to 4%, VAP has a much higher mortality rate ranging from 24% to 50%, and in some instances, it can reach as high as 76%. Approximately 10-28% of critical care patients develop VAP, making it the most common and deadly infection in the intensive care unit (ICU). In India, VAP affects 9-27% of intubated patients and doubles the risk of mortality compared to similar patients without VAP. VAP is also a significant contributor to Healthcare-Associated Infections, accounting for up to 60% of all cases. Additionally, VAP prolongs the length of stay in the ICU and increases the risk of morbidity and mortality for critically ill patients. While there is ongoing debate about the effectiveness of the flipped teaching method compared to traditional teaching methods, research suggests that the flipped classroom is more effective in promoting student engagement and learning outcomes.

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