A Comparative Study to Evaluate Jigsaw Learning Method versus Traditional Lecture for Teaching Mechanism of Labour among Nursing Students: A Cross-Sectional Study

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Abstract

The jigsaw method of teaching, first developed by Elliot Aronson in 1971 was further advanced by Robert Slavin in 1986 to assist students in overcoming learning gaps in recently desegregated schools in Austin, Texas (Teaching Methods). For the past 50 years, teachers have been utilising this method and its various components to promote collaboration in early grades through post-secondary classroom settings. This study was intended to determine if the traditional didactic lecture or the jigsaw learning method is more effective in teaching the mechanisms of labour. It was a quantitative study with a cross-sectional design, and comparative in nature, conducted in Global College of Nursing, Brite College of Nursing and Avk College of Nursing. The respondents were students studying in the 4th year BSc and the 3rd year GNM. The data was collected by using a structured questionnaire and followed by the intervention. Pre-test and post-test knowledge level on students' grade and learning experience among the Jigsaw learning method was x2 value of 289.93. Pre-test and post-test knowledge level on Students' grade and learning experience among the Traditional method was 272.58. There was an enhancement in terms of students' grades and learning experience among the Jigsaw learning method. Whereas the traditional group has no changes in the method of learning in the pre-test and post-test groups.

Key words: Jigsaw learning method, Traditional lecture, mechanism of labour

Current medical education literature emphasises the use of active learning and teamwork as an effective method to teach and engage learners. The jigsaw method, employed since 1970s, has proven to be effective in high school and college education. In this strategy members of the class are organised into groups and then rearranged into new groups to share their learning through peer teaching. Traditional pedagogical techniques are still very much the norm within higher education.

Student learning remains largely based upon extracting knowledge from texts and lectures. This style of teaching rarely allows students to apply their newfound knowledge to actual situations, resulting in a serious time lag between students learning and applying new knowledge. It is attributed to simulations and relates to the suggested improvements in overall student learning. Because much of the literature has stressed the increased levels of cognitive learning, it has the power to recreate complex, dynamic political processes in the lecture, allowing students to examine the motivations, behavioural constraints, resources and interactions among institutional actors (Konar, 2015). It was designed by social psychologist Elliot Aronson to help weaken racial cliques in forcibly integrated schools. A study by John Hattie found that the jigsaw method benefits students' learning (Jacob, 2015).

Objectives

The study was conducted with following objectives:

1. To assess the existing level of knowledge on the mechanism of labour among nursing students.
2. To determine if the traditional didactic lecture or the jigsaw learning method is more effective in teaching the mechanism of labour.
3. To introduce and implement the Jigsaw Puzzle method.
4. To assess the effectiveness of the Jigsaw puzzle method and compare it with the traditional method.

Methodology

For the present study, cross cross-sectional design with pre-test / post-test method was adopted; it was comparative in nature. Respondents were from three selected nursing colleges of Bengaluru, viz Global College of Nursing, Brite College of Nursing and Avk College of Nursing. The students meeting

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the inclusion criteria of constituted the sample. The sample size consisted of 500 BSc (N) 4th year, and 3rd year GNM students.

Data Collection Method

Stage1: Using the random method 250 respondents were selected for the traditional, and as many respondents for the jigsaw method, one setting one method.

Stage 2: Administered the socio-demographic data sheet, 20 structured points to both groups.

Stage 3: Jigsaw technique was introduced to 250 samples and the traditional teaching method to 250 samples.

Stage 4: A quiz was conducted after one week for the Jigsaw group and same day for the traditional group after the traditional class lecture.

Jigsaw Technique

Step1 - The sample is divided into 10 'Expert Groups' with 25 samples in each;

Step 2 - One sample in each group who has a sound academic performance is appointed as the group leader to lead the group;

Step 3: The concepts of the mechanism of labour are divided into 10 different segments, like labour preparation - Causes of the onset of labour; Phases of labour; False labour pain and true labour pain; Physiological changes during labour; Stages of labour; Physiology of the first stage of labour; Physiology of the second stage of labour; Mechanism of normal labour; Physiology of the third stage of labour;

Step 4: Each student in the expert group has to learn about different topics related to the Mechanism of labour. The group is instructed to prepare the topic well, read it well, do extra reading than textual notes, but at the same time to prepare something simple enough to teach as well as make other students learn faster. The assigned students are expected to shoulder the responsibility of preparing that topic well.

Step 5: Students are instructed not to memorise, but instead to prepare with understanding. A day was fixed to organise the Jigsaw classroom. Students initially can discuss their topics in their parent groups. Each student explains and presents their prepared topic.

Step 6: The students with similar topics made a group and discussed their topics. Each student had to share their acquired knowledge on their topics. The others noted down additional points.

Step 7: Students then returned to their expert groups and once again shared their topics, having new points. The investigator has floated between groups and facilitated the whole process.

Step 8: The Jigsaw group were assessed using the 20 structured points related to the mechanism of labour through a quiz after a week of going through the Jigsaw method.

Traditional Class Lecture

Step 1**:** Traditional lecture-cum-demonstration of the mechanism of labour for 250 samples.

Step 2: Conducted a quiz on the same day for the traditional group after the traditional class lecture

Results

Table 1: Classification of respondents by socio-demographic characteristics (N=50)

Characteristics	Category	Respondents					
		Jigsaw		Traditional		Combined	
		N	%	N	%	N	%
Age group	20 years	181	72.4	49	19.6	230	46.0
	21 years	43	17.2	146	58.4	189	37.8
	22 years	26	10.4	48	19.2	74	14.8
	23 years	0	0.0	7	2.8	7	1.4
Religion	Hindu	117	46.8	154	61.6	271	54.2
	Muslim	98	39.2	69	27.6	167	33.4
	Christian	35	14.0	27	10.8	62	12.4
Residence	Urban	143	57.2	108	43.2	251	50.2
	Rural	107	42.8	119	47.6	226	45.2
	Others	0	0.0	23	9.2	23	4.6
Type of Family	Joint	66	26.4	72	28.8	138	27.6
	Extended	37	14.8	146	58.4	183	36.6
	Nuclear	147	58.8	32	12.8	179	35.8
Total	-	250	100.0	250	100.0	500	100.0

In the jigsaw group, 181 (72.4%) students were in the age of 20 years, 43 (17.2%) were in the age of 21 years, 26 (10.4%) were in the age of 22 years, 0 (0.0%) in the age of 23 years (Table 1). In the traditional group, 49 (19.6%) were in the age of 20 years, 146 (58.4%) the age of 21 years, 48 (19.2%) were in the age of 22 years, and 7 (2.8%) were in the age of 23 years. In relation to residence for the group, 251 (50.2%) stay in urban areas, 216 (43.2%) belong to urban areas, and 23 (4.6%) others. Considering the type of family for both the group, 138 (27.6%) belong to joint family, 183 (36.6%) to extended family, and 179 (35.8%) to nuclear family.

Table 2: Classification of respondents by parents' educational level

Characteristics	Category	Respondents					
		Jigsaw		Traditional		Combined	
		N	%	N	%	N	%
Mothers Education	No formal educ	93	37.2	49	19.6	142	28.4
	Primary	124	49.6	165	66.0	289	57.8
	Secondary	33	13.2	24	9.6	57	11.4
	High school	0	0.0	12	4.8	12	2.4
Fathers Education	No formal educ	20	8.0	191	76.4	211	42.2
	Primary	77	30.8	14	5.6	91	18.2
	Secondary	153	61.2	25	10.0	178	35.6
	High school	0	0.0	20	8.0	20	4.0
Total	-	250	100.0	250	100.0	500	100.0

Table 2 revealed that for mother, jigsaw group had 33 (13.2%) secondary education, 0 (0.0%) high school education, 124 (49.6%) primary education, 93 (37.2%) no education, traditional group had 24 (9.6%) secondary education, 12 (4.8%) high school education, 165 (66.0%) primary education, 49 (19.6%) no education. For father, jigsaw group had 153 (61.2%) secondary education, 77 (30.8%) primary education and 0 (0.0%) high school education, 20 (8.0%) no education. Traditional group had 20 (8.0%) high school education, 25 (10.0%) secondary education 14 (5.6%) primary and 191 (76.4%) no education.

Table 3: Classification of respondents by parents' occupational level (N=500)

Characteristics	Category	Respondents					
		Jigsaw		Traditional		Combined	
		N	%	N	%	N	%
Father occupation	Home maker	165	66.0	33	13.2	198	39.6
	Business	62	24.8	49	19.6	111	22.2
	Private	23	9.2	136	54.4	159	31.8
	Government	0	0.0	32	12.8	32	6.4
Mother occupation	Home maker	48	19.2	207	82.8	255	51.0
	Business	59	23.6	13	5.2	72	14.4
	Private	143	57.2	14	5.6	157	31.4
	Government	0	0.0	16	6.4	16	3.2
Total	-	250	100.0	250	100.0	500	100.0

Table 3 revealed that for father's occupation, the jigsaw group had 165 (66%) homemakers, 62 (24.8%) business, 23 (9.2%) private. Traditional group had 33 (13.2%) home maker, 49 (19.6%) business, 136 (54.4%) private, 32 (12.8%) government. For mother's occupation, jigsaw group had 48 (19.2%) home maker, 59 (23.6%) business, 143 (57.2%) private. The traditional group had 207 (82.8%) homemakers, 13 (5.2%) business, 14 (5.6%) private,16 (6.4%) government.

Table 4: Classification of Respondents by Income, Food habits and extracurricular activities (N=500)

Characteristics	Category	Respondents					
		Jigsaw		Traditional		Combined	
		N	%	N	%	N	%
Family income/ month (Rs)	5000-10000	162	64.8	40	16.0	202	40.4
	11000-14000	51	20.4	168	67.2	219	43.8
	15000-20000	37	14.8	42	16.8	79	15.8
Food habits	Vegetarian	34	13.6	46	18.4	80	16.0
	Non-vegetarian	42	16.8	3	1.2	45	9.0
	Mixed diet	174	69.6	2 01	80.4	375	75.0
Extracurricular activities	Sports	41	16.4	67	26.8	108	21.6
	Dance	167	66.8	23	9.2	190	38.0
	Others	42	16.8	160	64.0	202	40.4
Total	-	250	100.0	250	100.0	500	100.0

As for monthly income, for jigsaw group, 162 (64%) having income of above Rs 5,000-10000, 51 (20.4%) had Rs 110,00 to 14,000, 37 (14.8%) had Rs 15000 to 20000. In traditional group, 40 (16%) had income above Rs 5,000-10000, 168 (67.2%) had Rs 110,00 to 14,000, 42 (16.8%) Rs 15000 to 20000. About food habits, in the jigsaw group, 34 (13.6%) were vegetarian, 42 (16.8%) non-vegetarian, 174 (69.6%) mixed diet. In traditional group, 46 (18.4%) were vegetarian 3 (1.2%) non- vegetarian, 201 (80.4%) mixed diet. About extracurricular activities, in Jigsaw group, 41 (16.4%) were sports, 67 (26.8%) dance, and 42 (16.8%) others. In traditional group, 67 (26.8%) were sports 23 (9.2%) dances,160 (64%) others.

Table 5: Response of pre-test knowledge level on students' grade and learning experience among Jigsaw learning and traditional method

Knowledge level	Respondents group			
	Jigsaw learning		Traditional method	
	Number	Percent	Number	Percent
Inadequate	107	42.8	126	50.4
Moderate	143	57.2	124	49.6
Adequate	0	0.0	0	0.0
Total	250	100.0	250	100.0
χ^2 test	2.20 NS			

NS: Non-significant, χ^2 (0.05,1df) = 3841

The distribution of knowledge level among students revealed (Table 5) that in the pre-test, in

the Jigsaw group, the majority of the respondents (n=107, 42.8%), had inadequate, 143 (57.2%) had moderate, and in the traditional group majority of the respondents (n=126, 50.4%), had inadequate, and 124 (49.6%) had moderate knowledge.

Table 6: Response of post-test knowledge level on students' grade and learning experience among Jigsaw learning and traditional method

Knowledge level	Respondents group			
	Jigsaw learning		Traditional method	
	Number	Percent	Number	Percent
Inadequate	0	0.0	0	0.0
Moderate	83	33.2	105	42.0
Adequate	167	66.8	145	58.0
Total	250	100.0	250	100.0
χ^2 test	4.13*			

The distribution of post-test knowledge level among students showed that in the jigsaw group the majority of the respondents (n=83, 33.2%) had moderate knowledge, 167 (66.8). In the traditional group majority of the respondents, 105 (42.0%) had moderate, 145 (58.0%) had adequate knowledge (Table 6).

Table 7 reveals that there was a significant association between pre-test scores of students grade and learning experience among Jigsaw learning method with age group, type of family, father's occupation, mother's occupation, family income, food habits, extracurricular activities whereas there was no significant association between pre-test scores of students grade and learning experience among Jigsaw learning method with mother's education, religion.

Table 7: Association between Demographic Variables and Pre-test Knowledge level on Students' grade and learning experience among the Jigsaw learning method (n=250)

Demographic variables	Category	Sample	Knowledge level				χ^2 value	p value
			Inadequate		Moderate			
			N	%	N	%		
Age group	20 years	181	70	38.7	111	61.3	6.74*	p<0.05 (5.991)
	21 years	43	26	60.5	17	39.5		
	22 years	26	11	42.3	15	57.7		
Religion	Hindu	117	48	41.0	69	59.0		
	Muslim	98	46	46.9	52	53.1	1.29 NS	p>0.05 (5.991)
	Christian	35	13	37.1	22	62.9		
Residence	Urban	143	69	48.3	74	51.7	4.06*	p<0.05 (3.841)
	Rural	107	38	35.5	69	64.5		
Type of family	Joint	66	22	33.3	44	66.7	6.61*	p<0.05 (5.991)
	Extended	37	22	59.5	15	40.5	-	
	Nuclear	147	63	42.9	84	57.1		
Mother's educ	No formal educ	93	37	39.8	56	60.2	1.64 NS	p>0.05 (5.991)
	Primary	124	58	46.8	66	53.2	-	-
	Secondary	33	12	52.2	11	47.8	-	-
Father's educ	No formal educ	20	11	55.0	9	45.0	6.25*	p<0.05 (5.991)
	Primary	77	40	51.9	37	48.1	-	-
	Secondary	153	56	36.6	97	63.4	-	-
Father occupation	Self employed	165	67	40.6	98	59.4	1.29 NS	p>0.05 (5.991)
Mother occupation	Home maker	48	22	45.8	26	54.2	6.76*	p<0.05 (5.991)
	Business	59	33	55.9	26	44.1	-	-
	Private	143	52	36.4	91	63.6	-	-
Family income/month (Rs)	5000-10000	162	63	38.9	99	61.1	6.73*	p<0.05 (5.991)
	11000-14000	51	21	41.2	30	58.8	-	-
	15000-20000	37	23	62.2	14	37.8	-	-
Food habits	Vegetarian	34	16	47.1	18	52.9	6.73*	p<0.05 (5.991)
	Non-vegetarian	42	25	59.5	17	40.5	-	-
	Mixed diet	174	66	37.9	108	62.1	-	-
Extra-curricular activities	Sports	41	17	41.5	24	58.5	7.66*	p<0.05 (5.991)
	Dance	167	64	38.3	103	61.7	-	-
	Others	42	26	61.9	16	38.1	-	-
Combined	-	250	107	42.8	143	57.2	-	-

Table 8: Association between demographic variables and pre-test knowledge level on students' grade and learning experience among the traditional method (n=250)

Demographic variables	Category	Sample	Knowledge level				χ^2 valuee	p value
			Inadequate		Moderate			
			N	%	N	%		
Age group	20 years	49	30	61.2	19	38.8	9.70*	p<0.05 (5.991)
	21 years	146	78	53.4	68	46.6		
	22/23 years	55	18	32.7	37	67.3		
Religion	Hindu	154	76	49.4	78	50.6	2.11 NS	p>0.05 (5.991)
	Muslim	69	39	56.5	30	43.5		
	Christian	27	11	40.7	16	59.3		
Residence	Urban	108	55	50.9	53	49.1	1.32 NS	p>0.05 (5.991)
	Rural	119	62	52.1	57	47.9		
	Others	23	9	39.1	14	60.9		
Type of Family	Joint	72	27	37.5	45	62.5	7.22*	p<0.05 (5.991)
	Extended	146	83	56.8	63	43.2		
	Nuclear	32	16	50.0	16	50.0		
Mothers Education	No formal edu	49	19	38.8	30	61.2	4.19 NS	p>0.05 (7.815)
	Primary	165	88	53.3	77	46.7		
	Secondary	24	14	58.3	10	41.7		
	High school	12	5	41.7	7	58.3		
Fathers educ	No formal educ	191	100	52.4	91	47.6	5.54 NS	p>0.05 (7.815)
	Primary	14	3	21.4	11	78.6		
	Secondary	25	14	56.0	11	44.0		
	High school	20	9	45.0	11	55.0		
Father occupation	Self employed	33	27	81.8	6	18.2	18.91*	p<0.05 (7.815)
	Business	49	17	34.7	32	65.3		
	Private	136	64	47.1	72	52.9		
	Government	32	18	56.3	14	43.8		
Mother occupation	Home maker	207	112	54.1	95	45.9	6.64*	p<0.05 (5.991)
	Business	13	4	30.8	9	69.2		
	Private/ Govt	30	10	33.3	20	66.7		
Family income/ month (Rs)	11000-14000	168	89	53.0	79	47.0	6.15*	p<0.05 (5.991)
	15000-20000	42	14	33.3	28	66.7		
Food habits	Vegetarian	46	17	37.0	29	63.0	4.07*	p<0.05 (3.841)
	Mixed diet	204	109	53.4	95	46.6		
Extracurricular Activities	Sports	67	26	38.8	41	61.2	6.23*	p<0.05 (5.991)
	Dance	23	10	43.5	13	56.5		
	Others	160	90	56.3	70	43.8		
Combined	-	250	126	50.4	124	49.6		

As Table 8 reveals, there was a significant association between pre-test scores of students grade and learning experience among traditional method with age group, type of family, father's occupation, mother's occupation, family income, food habits, extracurricular activities whereas there was no significant association between pre-test scores of students grade and learning experience among traditional method with father's education and religion.

Conclusion

There is need for clinical nurses to keep abreast with the knowledge and new developments by undergoing continuing education, in-service education and training to upgrade their knowledge and skills.

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