

## Effectiveness of Video Assisted Teaching on Utilization of Placental Stem Cells

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### Abstract

The purpose of the present study was to evaluate and associate the level of information on the utilization of placental stem cells before and after video assisted teaching and to associate it with the demographic variables. For this experiment, Quasi experimental – one group pretest and posttest only design was used. The tool used for the data collection consisted of two sections: Section A: demographic variables and Section B: structured questionnaire on utilization of placental stem cells. The experts in the field of Obstetrics and Gynecology Nursing and Biostatistics did the content validity of the tool. Pilot study was done with 5 staff nurses to assess the feasibility before undertaking the main study. The main study was conducted at Nirmala Medical Centre, Muvattupuzha, Kerala for a period of 1 month. Fifty staff nurses were randomly selected as samples for the experiment. The demographic data was collected using structured questionnaire. Pretest knowledge level of the staff nurses regarding utilization of placental stem cells was assessed using structured questionnaire. A video assisted teaching was given to the staff nurses regarding utilization of placental stem cells. The posttest was conducted on the following week using the same tool which was used for the pre-test. The data obtained using these tools were analyzed in the form of descriptive and inferential statistics. The outcomes of the study showed that the pretest mean score is 40.99 and posttest mean score is 84.93. It is higher than the pretest mean score. The calculated 't' value was 25.36 at 0.05 level of significance

which is higher than the table value of 1.96. The findings revealed that the video assisted teaching program had significant effect in the improvement of staff nurses level of knowledge regarding utilization of placental stem cells. The demographic variables were not associated with the posttest level of knowledge of staff nurses regarding the utilization of placental stem cells.

**Keywords** fetus, placenta, placental stem cells, video assisted teaching, umbilical cord

### Introduction

Placenta, an organ containing many blood vessels, connects the umbilical cord of fetus with the uterine wall. Since ages, the placenta has been considered as a waste and has been discarded. Then came a period when researchers found that this placenta can be used for various cosmetic purposes and now discovered that it has got various immature stem cells which can be used for treatment of various diseases. Basavanthappa, B. T. [1] describes in his book that the blood that remains in the blood vessels of the placenta and the section of the umbilical cord that remains adhered to it after the birth of a baby and the umbilical cord is cut, is called cord blood or placental blood. Eapen M. [2] explained that umbilical cord blood is not mother's blood; it is the baby's blood. Therefore, it is in its most basic form. In fact, it is full of stem cells that have gained significant importance in today science. Stem cells are the basic building blocks of our body.

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Bobak and Jenson, [3] explained that the blood from the veins of the umbilical cord is discarded as medical waste, which has been found to be a rich source of stem cells. Skene L. [4] explained that stem cells can be transformed into a particular organ when transplanted in to patient's body. This led to many discoveries about its treatment potentials. They found that more than 70 diseases can be cured through Stem Cell Therapy. Ishiyama et al., [5] mentioned that since 1970, bone marrow transplants have been used to rebuild patient's blood system as a part of treatment for Leukemia, immune deficiency, Aplastic anemia and Genetic metabolic disorders. Placental stem cells were first used for transplantation in 1998 in France for a patient with Fanconi's anemia which was proved to be a successful transplant.

Semenov et al., [6] revealed that placental stem cells can be easily harvested without posing any risks to both mother and child as compared to stem cell extraction from bone marrow and circulating blood. These stem cells can also be stored for a longer period of time and used as needed. Barker et al., [7] suggested that umbilical cord blood contains hematopoietic stem cells that can be used as an alternative to bone marrow transplantation in certain cases. Bhattacharya et al., [8] revealed that for the patients requiring an HLA matched donor, distinct placental stem cells can be efficiently employed as an alternate choice of hematopoietic stem cell transplantation. Brunstein et al., [9] explained that the hematopoietic stem cells remaining in the placenta after the umbilical cord has been cut can substitute for bone marrow in transplantation. It is argued that these cells should be retrieved and kept frozen as the child's personal biological spare part.

Bhattacharya et al., [8, 10] stated that cord blood is an efficient and harmless substitute for adult blood transfusion due to its composition with a mixture of fetal and adult hemoglobin, high platelets, WBC counts, plasma filled with cytokine, growth factors, its hypo antigenic nature and altered metabolic profile. Cairo and Wagner [11] revealed that there are several methods to collect umbilical cord blood. However, it should be remembered that it is not an invasive process. Dhot et al., [12] suggested that there are two options for cord blood collection. The first is to "donate" the cord blood and the another alternative is to have the placental

stem cells "banked" for possible future use by the family.

Ballen [13] revealed that a child's own cord blood is generated to be a perfect match for that child. This means that there is theoretically no chance that the cells will be rejected after transplantation. Pafumi et al., [14] explained that with the establishment of cord blood banks, the number of related and unrelated umbilical cord blood transplants is increasing worldwide. Placental stem cell transplants offer effective results comparable to those obtained with related or unrelated bone marrow transplants.

Saporta et al., [15] described that in recent years, placental stem cell transplantation has been increasingly used in both pediatric and adult patients. Careful collection of cord blood is of high importance in collecting quality cord blood units. Wagner et al., [16] explained that the utilization of umbilical cord blood as a source of stem cells for transplantation has substantially grown in the last decade.

However, this advancement in medical sciences regarding placental stem cells can be beneficial to general public only if they are aware about what placental stem cells are and how it is useful to them in treating illness. This awareness and motivation can be disseminated to public through staff nurses. As staff nurses, who are the backbones of public health, lack in this knowledge, it is crucial to enrich them with the related information. Hence, the objectives of the study are (a) to assess the level of knowledge on utilization of placental stem cells before video assisted teaching (b) to assess the level of knowledge on utilization of placental stem cells after video assisted teaching (c) to compare the level of knowledge on utilization of placental stem cells before and after video assisted teaching (d) to associate the level of knowledge on utilization of placental stem cells after video assisted teaching with their demographic variables.

## Methodology

A quantitative approach- quasi experimental, one group pretest and posttest only design was used for the study. The variables included independent variable which was video assisted teaching on the utilization of placental stem cells, and the dependent variable which was level of knowledge. The demographic variables were age, gender,

educational status, years of experience and profession, while the extraneous variables were mass media and area of exposure. The study was conducted at Nirmala Medical Centre, Muvattupuzha, Kerala, India which is a tertiary care multispecialty hospital providing the placental stem cell therapy. The sample consisted of the staff nurses who were working at Nirmala Medical Centre, Muvattupuzha, Kerala and fulfilled the inclusion criteria, were willing to participate in the study and were present during the time of data collection. The exclusion criteria included nurses who did not have a minimum of one year of experience and who had attended any type of education program regarding the utilization of placental stem cells. Simple random sampling method was adopted to select the samples for the study. The methodology got two parts- section 'A' that included demographic variables such as age, gender, educational status, years of experience and area of work; section 'B' involved questions to assess the level of knowledge regarding the placental stem cells. This contained 30 multiple choice questions.

**Table 1. Scoring Key prepared for 30 multiple choice questions**

QN. NO	ANSWER	QN.NO	ANSWER
1	C	16	A
2	C	17	D
3	C	18	C
4	A	19	B
5	B	20	A
6	B	21	C
7	B	22	A
8	B	23	C
9	B	24	B
10	A	25	A
11	D	26	D
12	A	27	C
13	B	28	C
14	B	29	B
15	B	30	A

### Scoring Key

The scoring was designed with regard to the tool to assess the level of knowledge regarding placental stem cells (Table 1). The total score was 30. Correct response was awarded with score '1', while incorrect response was awarded with score '0'. People with above 75%, 50-75% and below 50% marks were categorized as staff with adequate

knowledge, moderately adequate knowledge and inadequate knowledge, respectively.

### Ethical Consideration

The projected experiment was sanctioned by the dissertation board of S.R.M College of Nursing, S.R.M University Kattankulathur, Kancheepuram district. Permission was obtained from the Administrator, Nirmala Medical Center, Muvattupuzha. The written approval was acquired from the participants prior to assembling the data. Moreover, assurance was given to the individuals that the confidentiality of each individual will be maintained.

### Method of Data Collection

The data for the study was collected within four weeks with effect from 01.08.2012 – 31.08.2012. In the first week, an introduction was given to the staff nurses to develop a good rapport. The purpose of conducting this study was explained and reassurance was given to the nurses that collected data will be confidential. The oral and written consent of the nurses was obtained before the distribution of the questionnaire. On the second week a video assisted teaching was given to the nurses regarding the utilization of placental stem cells. The post- test was conducted on the following week using the same tool which was used for the pre-test. The data was collected from the staff nurses in groups of 8-9 for duration of 45 minutes per session. However, the data was collected and assessment was performed within specified time of four weeks.

### Statistical Analysis

The following descriptive statistical methods were used in the study (a) frequency distribution was used to analyze the demographic variables (b) frequency, percentage, mean and standard deviation was used to assess the knowledge. Inferential statistical method included paired 't' test to assess the effectiveness of video assisted teaching and Chi-square test to associate the knowledge scores of staff nurses with selected demographic variables.

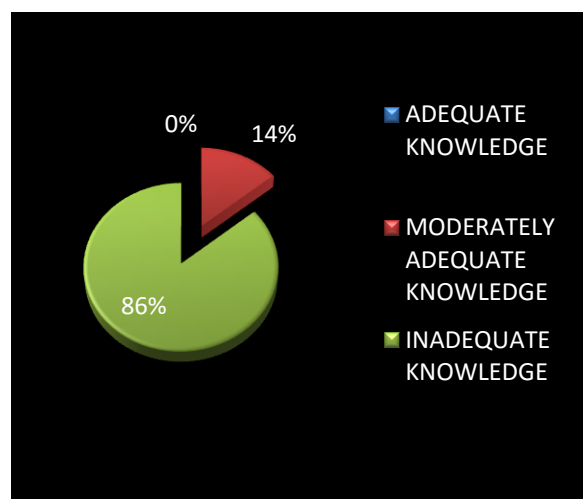
### Results

Table 2 shows that forty three (86%) staff nurses were under the age group of 20-30 years; four (8%) staff nurses were under the age group of 31-40 and

**Table 2. Frequency and percentage distribution of demographic variables with respect to staff nurses.**

S.NO	DEMOGRAPHIC VARIABLES	FREQUENCY (n)	PERCENTAGE (%)
1.	<b>Age in Years</b>		
	20 – 30	43	86
	31 – 40	4	8
	41 – 50	3	6
2.	<b>Gender</b>		
	Male	-	-
	Female	50	100
3.	<b>Educational Qualification</b>		
	Diploma in Nursing	39	78
	B.Sc. Nursing	11	22
4.	<b>Years of Experience</b>		
	1-5 years	43	86
	6-10 years	4	8
	11-15 years	3	6
	>15 years	-	-
5.	<b>Area of Work</b>		
	Medical ward	20	40
	Surgical ward	9	18
	Maternity ward	9	18
	Neonatology ward	4	8
	Casualty and other departments	8	16

three (6%) staff nurses were under the age group of 41-50 years. The data indicates that all the fifty (100%) staff nurses were females. The data showed that thirty nine (78%) staff nurses had completed Diploma in Nursing and eleven (22%) completed B.Sc Nursing. The data depicted that majority of them, forty three (86%) staff nurses had 1- 5 years of working experience; four (8%) of them had 6-10 years of working experience and three (6%) had 11-15 years of working experience.



**Figure 1. Percentage distribution of the pretest level of knowledge among staff nurses regarding utilization of placental stem cells**

Considering the area of work, twenty (40%) staff nurses were working in medical ward; nine (18%) in surgical ward; nine (18%) in maternity ward; four (8%) in neonatology ward and eight (16%) in casualty and other departments.

Table 3 shows that majority of the staff nurses (86 %) had inadequate knowledge regarding the utilization of placental stem cells, 7 of the staff nurses (14%) had moderately adequate knowledge while none had adequate knowledge about the utilization of placental stem cells prior to the video assisted teaching (Figure 1). Table 4 reveals that majority of the staff nurses (88%) had adequate knowledge, 6 of them (12%) had moderately adequate knowledge and

**Table 3 Distribution of statistical value of pretest knowledge score regarding utilization of placental stem cells among staff nurses**

Pre Test	Frequency (N)	Percentage (%)
Inadequate Knowledge	43	86.0
Moderately Adequate Knowledge	7	14.0
Adequate knowledge	-	-

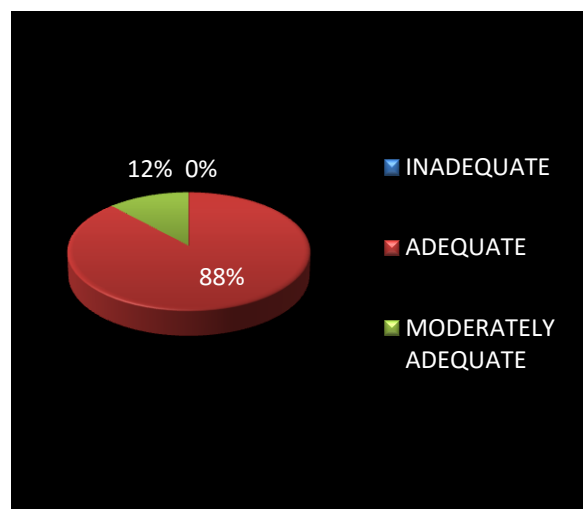
**Table 4** Distribution of statistical value of posttest knowledge score regarding utilization of placental stem cells among staff nurses

Post Test	Frequency (N)	Percentage (%)
Inadequate Knowledge	-	-
Moderately Adequate Knowledge	6	12
Adequate knowledge	44	88

none of them had inadequate knowledge regarding utilization of placental stem cells after the video assisted teaching (Figure 2).

Table 5 shows that the pretest mean score was 40.99 and posttest mean score was 84.93 that was higher than the pretest mean score. The calculated 't' value was 25.36 at 0.05 level of significance which was higher than the table value of 1.96. The findings revealed that the video assisted teaching program had significant effect in the improvement of level of knowledge of staff nurses about the utilization of placental stem cells (Figure 3).

Table 6 shows the association of demographic variables with posttest knowledge of staff nurses regarding utilization of placental stem cells. The table reveals that there was no significant association between the level of knowledge and demographic variables such as age, gender,

**Figure 2.** Percentage distribution of the post test level of knowledge among staff nurses regarding utilization of placental stem cells**Table 5** Distribution of statistical value of pretest and posttest knowledge score regarding placental stem cells among staff nurses

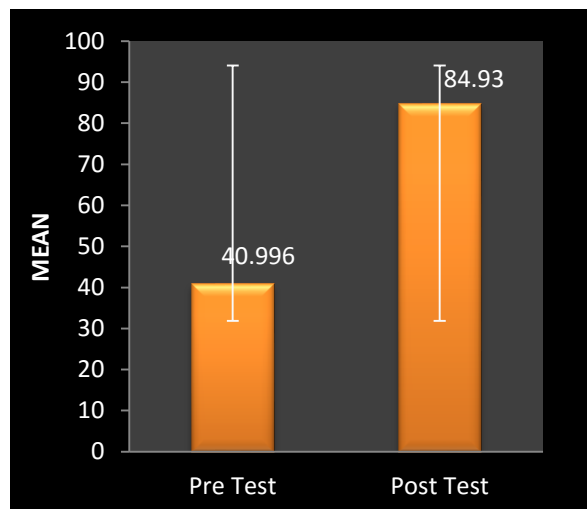
	Mean	Sd	Paired T Value	P Value
Pretest	40.996	9.1634	25.363	0.0001***
Posttest	84.930	9.1204		

educational status, years of experience and area of work.

### Discussion

Stem cells are revolutionary innovation in recent regenerative medicine. They have huge potential in regenerative medicine through their ability to generate cells and tissues. These can be segregated to different cell types of variable functions and thus, act as sustainable basis of replacement cells and tissues - to cure diseases such as Parkinson's & Alzheimer's diseases, spinal cord injury, stroke, burns, heart disease, diabetes, osteoarthritis and rheumatoid arthritis.

Contemporary findings have shown the likelihood of straight differentiation of stem cells into heart muscle cells or insulin-producing pancreatic cells. Additionally, it is now likely to differentiate stem cells directly into stem culture to

**Figure 3.** Percentage distribution of pretest and post test knowledge score regarding placental stem cells among staff nurses

produce new insulin producing cells that could ultimately be utilized in transplantation therapy for diabetes. So, consciousness on Placental Stem cell therapy is essential among the health experts.

The results obtained in the pretest showed that majority of the staff nurses (86 %) had inadequate knowledge regarding utilization of placental stem cells, 7 of the staff nurses (14%) had moderately adequate knowledge and none of them had adequate knowledge regarding utilization of placental stem cells. The tests mean score was 41. This showed that staff nurses had poor knowledge on the utilization of placental stem cells. A similar study was conducted by Fernandez et al., [17] to evaluate the awareness among pregnant women relating to the collection, testing and banking of cord blood stem cells. It was found that a large part of mothers had poor or very poor knowledge about the cord blood banking.

In the post test, after the video assisted teaching, majority of the staff nurses (88%) had adequate knowledge, 6 of them (12%) had moderately adequate knowledge and none of them had inadequate knowledge regarding the utilization of placental stem cells. The mean score of posttest

knowledge was 85. This showed that the staff nurses have adequate knowledge on the utilization of placental stem cells after the video assisted teaching. A similar study was conducted by Reza et al., [18] to assess the knowledge of health care professionals regarding cord blood stem cells. About 89% of the health care professionals verbalized gain in their knowledge in the area of stem cells.

Our findings revealed that the video assisted teaching programme has significant effect in the improvement of staff nurses level of knowledge regarding utilization of placental stem cells. Hence the hypothesis stating that there is a significant difference in the knowledge score about the placental stem cell utilization before and after video assisted teaching is accepted. A similar study was conducted by Dinç and Sahin [19] in which a posttest was conducted among the nurses one year after the education was offered regarding utilization of cord blood stem cells. The posttest knowledge showed a rise in the knowledge regarding the utilization of cord blood stem cells.

**Table 6 Association of demographic variables with post-test knowledge score of staff nurses regarding placental stem cells isolated bacteria.**

Demographic Variables		Moderately adequate knowledge		Adequate knowledge		Total	chi square value	p value
		N	%	N	%			
Age	20 - 30 Yrs	6	14	37	86	43	1.110	0.574 NS
	31 - 40 Yrs	0	0	4	100	4		
	41- 50 Yrs	0	0	3	100	3		
Gender	Male	-	-	-	-	-	-	-
	Female	6	12	44	88	50	NA	NA
Educational Status	Diploma in Nursing	6	15.4	33	84.6	39	1.923	0.166 NS
	B.Sc. Nursing	0	0	11	100	11		
Experience	1-5 years	6	14	37	86	43	1.110	0.574 NS
	6-10 years	0	0	4	100	4		
	11-15 years	0	0	3	100	3		
Area of Work	Medical ward	2	10	18	90	20	4.019	0.403 NS
	Surgical ward	2	22.2	7	77.8	9		
	Maternity ward	0	0	9	100	9		
	Neonatology ward	0	0	4	100	4		
	Causality and other departments	2	25	6	75	8		

Association of the level of knowledge on utilization of placental stem cells with demographic variables was done using the chi square test. The analysis revealed that the demographic variables—age, sex, educational qualification, years of experience and area of work were not associated with posttest knowledge of staff nurses regarding the utilization of placental stem cells. Hence, the hypothesis stating that there is a significant association of the level of knowledge scores about the utilization of placental stem cells after video assisted teaching with their selected demographic variables' is rejected.

### Conclusion

The study revealed that the knowledge of staff nurses regarding utilization of placental stem cells was improved after the video assisted program. The pretest mean score was 40.99 and posttest mean score was 84.93, which was higher than the pretest mean score. The calculated 't' value 25.363 at 0.05 level of significance was higher than the table value of 1.96. The findings revealed that the video assisted teaching program has significant effect in the improvement of staff nurses level of knowledge regarding the utilization of placental stem cells. The demographic variables were not associated with the posttest level of knowledge of staff nurses regarding the utilization of placental stem cells.

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