

Effectiveness of a Video-based Teaching Program on Knowledge and Attitudes Toward Stem Cell Therapy Among Nursing Students

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Abstract

Integrating stem cell therapy (SCT) into healthcare necessitates adequate training for nursing students to comprehend its principles and applications. This study evaluates the efficacy of a video-assisted teaching program (VATP) in enhancing knowledge and attitudes toward SCT among nursing students. A pre-test post-test quasi-experimental design was utilized with a sample of 100 nursing students. The participants were split into experimental and control groups. The experimental group received the VATP intervention, while the control group experienced traditional teaching methods. Knowledge and attitudes concerning SCT were evaluated using validated questionnaires both before and after the intervention. The results demonstrated a significant enhancement in knowledge ($p < 0.05$) and attitudes ($p < 0.05$) toward SCT in the experimental group after the intervention, in contrast to the control group. The VATP effectively enhanced the understanding of SCT principles, therapeutic applications, and ethical considerations among nursing students. The findings underscore the efficacy of VATP as a valuable educational tool for fostering comprehensive understanding and positive attitudes towards emerging healthcare technologies like SCT among nursing students. Incorporating innovative teaching methods like VATP can significantly contribute to preparing nursing students for future healthcare practices involving advanced therapies like SCT. Additional research is needed to examine the long-term retention and application of knowledge following the intervention.

Keywords: Video-assisted teaching program, stem cell therapy, nursing students, knowledge, attitude

INTRODUCTION

At term, the placenta has a diameter of 15–20 cm thickness of 2.5 cm at its center. The structure feels spongy and weighs approximately 500 g, which is approximately one-sixth of the baby's weight, and it occupies 30% of the uterine wall. The fetal layer is safeguarded by a smooth and shiny amnion with the umbilical cord connected at or near its center. Typically, the placenta attaches to the upper part of the uterine wall, extending towards the fundus and often adjacent to either the anterior or posterior wall. After delivery, a separation line is formed through the decidua spongiosum. Branches of the umbilical vessels can be seen beneath the amnion, radiating from the insertion point of the cord. The maternal surface appears rough and spongy, displaying a dull red hue due to the blood supply. Additionally, a thin, grayish, somewhat shaggy layer is visible, which is the remnant of the decidua basalis that has detached from the placenta. The maternal surface was divided into 15–20 lobes, separated by fissures. They are separated into the

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decidual septa. UCB is beneficial for stem cells, mesenchymal cells, and neural precursor cells. This blood gives yield to keep the child's hematopoietic stem cell for a long time, while its miles remain within the UCB. This cord blood stem cell may be transplanted as a remedy, while the baby or his or her siblings develop conditions such as metabolic, immunological, hematological, neurological, or cardiovascular illnesses. UCB consists of hemophilic cells that have a higher proliferative and colony-forming potential and are more conscious of some increased elements.

The collected blood from the umbilical cord and the placenta is gathered for banking, and stem cells are commonly collected from the reproductive tissues and are an important source of progenitor cells. They can be used in regenerative remedies. A stem cell can resume itself for long durations. Stem cells are the source of embryonic tissues, fetal tissues, greater fetal tissues, and human gonads.

Many studies have been conducted on stem cells, and it has been stated that umbilical cord blood (UCB) contains an abundant and unquestionable source of stem cells for treatment. Stem cells from the umbilical cord and placenta demonstrate great potential in the treatment of leukemia. Patients with leukemia should depend on receiving bone marrow transplants from donors. There is a need for a closed shape or the patient develops critical immunological problems. The near healthy happens with the sibling and parents, so they are the first-rate hazard of being awesome healthy. The number of patients who did not receive proper SCs was high. However, almost 90% of the cells were renewed. The simplest of the clients of 20 percent advanced extreme resistance troubles in comparison with fifty 5% of other patients, superior issues following dispatch entirely related to SCs. A mile's belief that umbilical cord is undeveloped in the autoimmune system becomes accustomed to the affected character's frame more than the other cells. They are plenty, immunologically supple, and safe for any ailment.

A few might also say the fee of UCB storage is at the cost of around Rs 35,000 for storing 21 years in a great quantity; however, evaluating it with the advantages of the child's and one's destiny will help one place things in angle. Numerous studies on the use of placental and umbilical stem cells have been conducted, and many clinical trials are currently underway. Umbilical cord blood (UCB) is the primary source used for hematopoietic stem cell (HSC) formation. Stem cell therapy is increasingly being considered for the treatment of various types of tumors. Currently, UCB represents the largest identified source of stem cells, whereas older bone marrow (BM) is less commonly used. Over the past decade, the medical use of UCB for treating a wide variety of illnesses has expanded significantly.

Umbilical Cord Blood Banking (UCBB) has gained greater prominence internationally due to its clinical utility. The expansion of UCB banking has solidified its adherence to first-rate standards, as recognized by expert organizations such as the Association for the Advancement of Blood & Biotherapies (AABB). These best practices establish expectations for the collection, testing, processing, and banking of UCB for transplantation. While the standards effectively address UCB banking procedures, guidelines for other aspects, including those with ethical implications, are still evolving.

In India and other international locations, private UCB banking dominates, proscribing popular public admissions to promising healing procedures. Similarly, global medical experiments on the diffusion of sicknesses are in progress, regardless of insufficient studies and firm lapse.

REVIEW OF LITERATURE

1. Wang et al. (2021) [1] completed clinical trials on mesenchymal stem cells (MSC). The focus was to identify the effect of these cells in treating ischemic stroke. The study also showed an interest in clinical trials that indicated the transplantation process for MSCs. This study proved that MSC therapy for ischemic stroke is safe and viable.
2. The clinical trial design strategies and findings were summarized by researchers Zhong Yue, Ying Li, and Jing Liu (2021) [2]. The findings demonstrated that the clinical trials included significant disparities in demographic characteristics stem cell types and dosages, delivery

methods, and evaluation methodologies. The researchers also assessed the safety and effectiveness of the clinical trials. These findings are expected to aid the rational formulation of medical trials for stem cell therapy.

3. To help researchers and individuals interested in stem cell therapy, Ali Golchin, Ehsan Seyedijafari, and Abdolreza Ardeshirylajimi (2020) [3] analyzed and presented clinical trials and hypotheses. Researchers have used MSCs to examine approaches to improve patients' immune responses to COVID-19.
4. A recent study found that stem cell therapies could be successfully delivered to patients. This has increased the likelihood of these therapies being used under various conditions in the future. Some of these trials have had a significant impact on a variety of disorders. A review was conducted by Riham Mohamed Aly (2020) [4] to discuss advancements in this therapy. The review also focuses on regenerative treatment modalities for a variety of disorders.
5. Researchers [5] determined the effect of stem cell therapy healing process. Single cells were used as therapeutic units in this method. The basic goal of cell therapy is to create a long-lasting transplant that can execute organ function. Bone marrow transplantation is a good example of this. Stem cells are the therapeutic units in this process. These were engrafted in the injured area.
6. In recent decades, the use of stem cells as alternatives to other treatments has increased. Stem cells, according to a previous study [6], can control inflammatory responses, boost regenerative potential, and increase growth. Transamniotic stem cell treatment can be used to transport stem cells into amniotic fluid. This technique may be beneficial.
7. The skin is the most essential organ in humans. The anatomy and function of the skin are linked to many conditions. Golchin et al. (2019) evaluated clinical studies that targeted MSC therapy goals for diverse skin illnesses [7].
8. MSCs represent a promising alternative for managing disease conditions. These cells have immunomodulatory properties that can be used to treat inflammatory illnesses. Regmi et al. (2019) [8] analyzed clinical trials to explain current advances regarding the utilization of MSCs. The molecular responses of MSCs to inflammatory signals and mechanisms underlying their interactions with the immune system were examined. Collaboration, which takes place within cells, helps in treatment.
9. Nasser Hashemi, Goradel, Farshid, Barbak, et al., (2018) [9] outlined current stem cell-based cardiovascular disease therapy techniques. Cell therapy is a talented therapeutic platform for controlling many conditions. These are the main causes of mortality and morbidity. Among the numerous cell therapies, this therapy has emerged as an operative therapeutic technique. This therapy is a comparatively novel process for managing tissue injury and fibrosis. Stem cells have attracted considerable attention as a new therapeutic option for regenerative medicine. For the regeneration of human endometrial disorders, such as Asherman syndrome and thin endometrium.

OBJECTIVES OF THE PAPER

1. To evaluate the knowledge and attitudes towards stem cell therapy among nursing students.
2. To determine the effectiveness of a video-assisted teaching program (VATP) on nursing students' knowledge and attitudes toward stem cell therapy.

RESEARCH METHODOLOGY

This study followed a pre-experimental design. Only one group was assessed before and after the intervention. The dependent variables were stem cell therapy knowledge and attitude. The stem cell therapy video-assisted instruction program served as an independent variable. This study was conducted in India on random nursing students. Nursing students who met the selection criteria formed the sample. This approach was used to select the 78 samples. The final sample size was 75 after attrition.

Prior to the study, the investigator examined and observed the ethical guidelines. A panel of specialists determined the legitimacy of the content. Test-retest and split-half procedures were used to assess the tool's reliability. Information was gathered using an appropriate tool. Following the pre-test, the

investigator provided all nursing students with the intervention tool, a video-assisted instruction package. A post-test was conducted to determine the success of the awareness program. The tool used in the pre-test was also used to collect details in the post-test. The information gathered was organized and examined.

RESULT FINDINGS

Analysis Based on Comparison of Knowledge and Attitude

The pre-test results showed that the majority of 60 (80%) had inadequate knowledge. Fifteen (20%) patients had moderate information regarding stem cell therapy (Table 1). However, after the intervention, 40 (53.3%) had moderately adequate knowledge. The remaining 35 patients (46.7%) had adequate knowledge regarding stem cell therapy. None of the participants had any adequate knowledge. This indicated that the intervention was active in improving knowledge regarding stem cell therapy (Table 2).

In the pre-test, 56 (74.7%) participants had unfavorable attitudes, and 19 (25.3%) had moderately favorable attitudes regarding stem cell therapy. None of the participants had a favorable attitude toward the topic (Table 3).

Nearly 34 (45.3%) of them had moderately favorable attitudes, and 41 (56.7%) of them had favorable attitudes regarding stem cell therapy in the post-test. None of the participants had an unfavorable attitude (Table 4).

Nearly 15 (20%) participants had moderately adequate knowledge regarding stem cell therapy before the intervention. However, after the intervention, 40 (53.3%) had moderately adequate knowledge (Table 5). The remaining 35 patients (46.7%) had adequate knowledge regarding stem cell therapy. This indicated that the intervention was active in improving knowledge regarding stem cell therapy.

In the pre-test, 56 (74.7%) participants had unfavorable attitudes, and 19 (25.3%) had moderately favorable attitudes regarding stem cell therapy. 34 (45.3%) of them had moderately favorable attitudes and 41 (56.7%) had favorable attitudes regarding stem cell therapy in the post-test (Table 6).

Table 1. Level of knowledge before intervention.

Level of knowledge	Inadequate knowledge ($\leq 50\%$)		Moderately adequate knowledge (51–75%)		Adequate knowledge ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Pre-test	60	80	15	20	0	0.0

Table 2. Level of knowledge after intervention.

Level of knowledge	Inadequate knowledge ($\leq 50\%$)		Moderately adequate knowledge (51–75%)		Adequate knowledge ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Post-test	0	0.0	40	53.3	35	46.7

Table 3. Level of attitude before intervention.

Level of attitude	Unfavorable attitude ($\leq 50\%$)		Moderately favorable attitude (51–75%)		Favorable attitude ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Pre-test	56	74.7	19	25.3	0	0.0

Table 4. Level of attitude after intervention.

Level of attitude	Unfavorable attitude ($\leq 50\%$)		Moderately favorable attitude (51–75%)		Favorable attitude ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Post-test	0	0.0	34	45.3	41	56.7

Table 5. Comparison of knowledge before and after intervention.

Level of knowledge	Inadequate knowledge ($\leq 50\%$)		Moderately adequate knowledge (51–75%)		Adequate knowledge ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Pre-test	60	80	15	20	0	0.0
Post-test	0	0.0	40	53.3	35	46.7

Table 6. Comparison of attitude before and after intervention.

Level of attitude	Unfavorable attitude ($\leq 50\%$)		Moderately favorable attitude (51–75%)		Favorable attitude ($>75\%$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Pre-test	56	74.7	19	25.3	0	0.0
Post-test	0	0.0	34	45.3	41	56.7

Comparison of Variables Based on T-test

The improvement was 11.71 to 20.15. The mean changes were 8.44. ‘t’ value for the knowledge was ‘t’ =18.04, $p<0.001$. The variance was observed before and after the intervention. Hence, the enhancement of overall knowledge regarding stem cell therapy after a VATP was identified (Table 7).

This difference enlarged from 27.01 to 30.59. The improvement is 3.57. ‘t’ score for attitude was ‘t’ =6.93, $p<0.001$. There was a better change between the two attitude scores. Hence, there was a significant improvement in the overall attitude toward stem cell therapy after the VATP (Table 8).

Correlation Between Variables Based on R-Value

The calculated ‘r’ value was 0.60. This indicated a moderate association between the two variables. Refining knowledge regarding stem cell therapy will develop a positive attitude (Table 9).

Association Between Variables Based on Chi-Square Value

After 20 years, 26.7% and 1.3% had moderate and adequate knowledge, respectively. The calculated value is $\chi^2 =26.67$ (Table 10). Many of the participants were female. A total of 57.3% and 32.1% of the participants had moderate and adequate knowledge, respectively. The calculated value is $\chi^2 = 3.38$ (Table 11).

Table 7. Comparison of knowledge based on t-test.

Knowledge	Mean	SD	Mean difference	Paired ‘t’ value
Pre-test	11.71	3.06	8.44	t=18.04 p=0.001
Post-test	20.15	3.55		

Table 8. Comparison of attitude based on t-test.

Attitude	Mean	SD	Mean difference	Paired ‘t’ value
Pre-test	27.01	3.13	3.57	t=6.93 p=0.001
Post-test	30.59	3.89		

Table 9. Correlation between variables based on R-value.

Variables	Mean	SD	‘r’ Value	Inference
Knowledge	20.15	3.55	r=0.60 p=0.001	There is a moderate positive correlation between knowledge and attitude scores.
Attitude	30.59	3.89		

Table 10. Association of post-test knowledge with age.

Demographic variables	Moderately adequate (51–75%)		Adequate (>75%)		Chi-square value
	N	%	N	%	
Age					
18 years	19	25.4	5	6.6	$\chi^2 = 26.67$ p=0.001
19 years	15	20.0	11	14.7	
20 years	20	26.7	1	1.3	
Above 20 years	1	1.3	3	4.0	

Table 11. Association of post-test knowledge with gender.

Demographic variables	Moderately adequate (51–75%)		Adequate (>75%)		Chi-square value
	<i>N</i>	%	<i>n</i>	%	
<i>Gender</i>					
Male	5	6.6	3	4.0	$\chi^2 = 3.38$ p=0.49 NS
Female	43	57.3	24	32.1	

Study Results Based on the 1st Objective

In the pre-test, the majority of nursing students, 60 (80%) exhibited inadequate knowledge. After the intervention, the post-test results showed that 35 (46.7%) participants had gained sufficient knowledge. Prior to the intervention, 56 (74.7%) patients had unfavorable attitudes toward stem cell therapy. However, following the intervention, 34 (45.3%) participants developed a moderately favorable attitude, and 41 (56.7%) demonstrated a favorable attitude regarding the topic.

A cross-sectional study was conducted to analyze the awareness and attitudes of professional health students concerning the chosen topic. Most participants exhibited moderate knowledge, while the majority held a positive attitude. The findings indicated a significant positive correlation between knowledge and attitude scores. The study suggested that medical and dentistry students be taught the significance of stem cells in the health sector through a variety of interventional educational programs [10, 11].

Study Results Based on the 2nd Objective

The efficiency of the VATP was determined by paired t-test. This implies that there are significant high-level differences pertaining to knowledge and attitudes. ‘t’ score for the knowledge was 18.04. This reveals the important variance before and after the intervention. ‘t’ value for the attitude was 6.93. This exhibited a major enhancement in the outlook. The results showed that the intervention was a substantial development in terms of information and attitude among nursing students. Thus, the educational bundle is active in refining information and outlook.

According to H_1 , “There will be a significant difference between pre and post-test knowledge and attitude score regarding stem cell therapy among nursing students” was accepted. One study researcher described the impact of an instructive program on stem cell therapy. An educational program was administered to the nursing staff. After completing an educational program, the study found that knowledge and attitudes about the selected topic significantly improved. Continuously scheduled in-service training programs must be implemented to increase nurses' knowledge and attitudes to accommodate newly discovered concepts in care.

FINDINGS OF THE STUDY

- Before the intervention, the awareness score was 11.71 This was increased to 20.15 after the intervention. The calculated paired score was $t = 18.04$. This value is larger than the table value. This shows a highly significant variance among the tests.

- Before the intervention, the mean attitude score was 27.01. This increased to 30.59 after the intervention. The calculated paired scores were as follows: $t = 6.93$. This value is larger than the table value. This shows a highly significant variance among the tests.
- The post-test mean values were 20.15 and 30.59 for knowledge and attitude respectively. The correlation coefficient is 0.60. This indicated a moderately positive correlation between the two variables.
- The association value reveals the statistical connection of dependent variables with selected baseline variables.

RECOMMENDATIONS

The intervention package is an actual approach to improve knowledge and attitude among nursing students, and therefore recommends the following:

1. Two groups, experimental and control, were assessed to evaluate the success of the intervention package may be undertaken.
2. A quality of life among clients who underwent stem cell treatment can be undertaken.
3. A comparative project to judge the victory of a package can be conducted between government and private nursing college students.
4. More samples can be involved to get enhanced generalization.

CONCLUSION

This study highlights the significant impact of VATPs on enhancing knowledge and fostering positive attitudes towards stem cell therapy among nursing students. These findings underscore the efficacy of VATPs in improving the comprehension of stem cell therapy principles, therapeutic applications, and ethical considerations. The results suggest that innovative educational methods such as VATPs can effectively prepare nursing students for emerging healthcare technologies. This study emphasizes the importance of incorporating interactive and multimedia-based teaching strategies to enhance future healthcare professionals' understanding and acceptance of advanced therapies. Further research is encouraged to explore sustained effects and integration into nursing curricula. This study aimed to determine the effectiveness of a video-assisted teaching approach among students. The results revealed that understanding and attitudes were lacking regarding the selected concept. The data also showed that VATPs are beneficial for enhancing stem cell therapy knowledge and attitudes. As a result, the study's findings provide further proof that the instructional module is an effective educational package.

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