



Effect of structured teaching module (STM) on umbilical cord blood banking (UCBB) among staff nurses serving at selected tertiary care Hospital, Maharashtra

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Abstract

Aim of the study: to find out the effect of structured teaching module (STM) on Umbilical cord blood banking (UCBB) among staff nurses serving at selected tertiary care hospital, Maharashtra. To assess the knowledge of Staff nurses on umbilical cord blood banking before intervention 2. To assess the knowledge of staff nurses on umbilical cord blood banking after intervention 3. To find out the association between post-test knowledge scores on umbilical cord blood banking and selected demographic variables.

Methodology: A pre-experimental with one pretest and post group design used for the study. It was conducted over 110 staff nurses by purposive sampling technique.

Results: To collect data on demographic variables & structured interview schedule (SIS) was used among staff nurses' group before and after an intervention. After a pre-test, structured teaching module was used to teach on umbilical cord blood banking among 110 staff nurses of experimental group. However, after one week, the post test was conducted among staff nurses to assess the effect of structured teaching module on umbilical cord blood banking. From the findings, it was observed that whereas no Staff nurse had good and very good level of knowledge prior to the intervention, the percentage of staff nurse with very good knowledge increased to 37.7% after the intervention on UCBB. Similarly, after intervention, the number of staff nurses with good level of knowledge rose up to 43 (42.1%) from 0 (0%). However, the staff nurses with average knowledge rose to 23.8% from 12.7%. Further, it is seen that after intervention none of the staff nurses had poor and very poor knowledge. There was about 40.2% improvement in knowledge among staff nurses after UCBB. There was a significant difference ($p < 0.05$) between post-test knowledge scores and selected demographic variables like Age in years, Education, residence area of staff nurses, religion, source of information and source of knowledge. findings of study revealed that the STM on UCBB was effective among staff nurse serving at tertiary care hospital.

Keywords: Structured teaching module, knowledge, umbilical cord blood banking, staff nurses

Introduction

Umbilical cord blood is the blood that stays in the placenta and umbilical cord after the baby is born. All of the components of whole blood, including red blood cells, white blood cells, plasma, platelets, and hematopoietic stem cells, are present in umbilical cord blood.¹ Every living thing is composed of a single cell. The human body's smallest structural and functional unit. The blood that remains in your baby's umbilical cord following birth is known as cord blood. It comprises red and white blood cells, platelets, and plasma, much like normal blood, but it also contains a unique kind of bone marrow-derived stem cell that can support the immune system. The ability of these cells to develop into many blood cell types makes them special. They are valuable because of their capacity to change into other cells^[2].

Even when there is a partial HLA mismatch, umbilical cord blood stem cell transplantation has been utilized to treat a variety of malignant diseases, hematological illnesses, immune deficiency disorders, and hereditary metabolic abnormalities. In an otherwise straightforward delivery, the collection technique is safe for both the mother and the child. Promoting public cord blood banking over private banking is a good idea. When an existing family member (sibling or biological parent) has an illness that allogeneic stem cell transplantation has been shown to treat, private

Cord blood banking is strongly advised. Otherwise, private cord blood banking should be discouraged as it is not a "biological insurance." Currently, hematological malignancies, metabolic problems, and genetic illnesses cannot be treated using autologous cord stem cells. Private banking advertisements can contain false information. Legislative action is necessary to standardize cord blood banking marketing tactics^[12].

Background

Since the first successful umbilical cord blood transplant was done in 1988, an estimated 35,000 transplants have been carried out in both adults and children to treat hereditary blood and immune system abnormalities, hematological cancers, and inborn metabolic defects. In order to collect and store umbilical cord blood, two different kinds of banks have developed: 1) public banks, and 2) private banks. The patient should be informed of the advantages and disadvantages of both private and public umbilical cord blood banking since they have various uses. The idea of using umbilical cord blood with the both way autologously and allogeneic should be included in the patient's conversation. Since preserved cord blood retains the same genetic variation or premalignant cells that caused the illness being treated^[3].

Since the initial cord blood transplant in 1988, more than 25,000 allogeneic cord blood transplants have been carried out globally. Over 400,000 cord blood units are kept in more than 100 quality-controlled public cord blood banks and over 780,000 units are kept in more than 130 private cord blood banks globally^[17].

Need of the Study

Umbilical cord blood (UCB) stem cells are used to treat over 80 illnesses and are a common treatment for hereditary immune system problems, leukaemia's, lymphomas, and myelodysplasias. There have been four CB transplants performed. In response to inquiries from parents regarding cord blood donation and bank, as well as the kinds (private versus public) and quality of cord blood banks, this policy statement is meant to serve as a guide for pediatricians, obstetricians, and other medical professionals. For children with certain deadly illnesses, cord blood is a great source of stem cells for hematopoietic stem cell transplantation. Families that choose for public banking receive free cord blood procurement, characterisation, and cryopreservation. Private banking, however, comes at a high family cost that is not insured, and the unit might never be used. Numerous national and international accrediting organizations have conducted quality-assessment evaluations, which reveal that private cord blood banks are more costly for families, less regulated for quality control, and underutilized for treatment. Undoubtedly, research into the utilization of cord blood storage is necessary to develop novel and significant alternative methods for reestablishing the hematopoietic blood system in patients with blood diseases and cancers, as well as potentially regenerating tissue systems in the future.⁵

Problem Statement

A study to assess the effect of structured teaching module (STM) on Umbilical cord blood banking (UCBB) among staff nurses serving in selected tertiary care hospitals, Maharashtra.

Objectives

Primary objective

To assess the effect of STM on umbilical cord blood banking among staff nurses at selected tertiary care hospitals.

Secondary objective

1. To assess the knowledge on umbilical cord blood banking among staff nurses at selected tertiary care hospital before intervention.
2. To assess the knowledge on umbilical cord blood banking among staff nurses at selected tertiary care hospital after intervention
3. To find out the association between the post-test knowledge score on umbilical cord blood banking and selected demographic variables of staff nurses.

Hypothesis

H01: There is no significant difference between pre-test and post-test knowledge scores on umbilical cord blood banking among staff nurses at selected tertiary care hospital Maharashtra State.

H02: There is no significant association between post-test knowledge scores on umbilical cord blood banking and selected demographic variables of staff nurses.

a. Title

“Effect of Structured Teaching Module (STM) On Umbilical Cord Blood Banking Among Staff Nurses Serving At Selected Hospital, Maharashtra.”

b. Objectives

Primary objective: To assess the effect of STM on umbilical cord blood banking among staff nurses at selected tertiary care hospitals.

Secondary objectives:

1. To assess the knowledge on umbilical cord blood banking among staff nurses at selected tertiary care hospital before intervention.
2. To assess the knowledge on umbilical cord blood banking among staff nurses at selected tertiary care hospital after intervention.
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c. Operational Definition

Assess

“Refer to statistical measurement of knowledge by using structured interview schedule (SIS) on umbilical cord blood banking among staff nurses at selected tertiary care hospitals of Maharashtra before and after an intervention.”

Effect

“It Refers to Statistical differences (A result of STM) in post-test knowledge score of staff nurses measures using structured interview schedule”.

Structured teaching module on umbilical cord blood banking

“It refers to a systematically planned, organized and executed teaching activity with specific objectives to impart knowledge regarding umbilical cord blood banking among staff nurses”.

Knowledge

“It refers to written responses of staff nurses to the knowledge items in SIS umbilical cord blood banking For the purpose of study, the knowledge is divided as; very poor, poor, average, good & very good”.

Staff nurse

“It refers to the employees registered as RNRN of both genders with diploma or degree qualification in nursing working in selected tertiary care hospitals of Maharashtra”.

Tertiary care hospital

“It refers to the selected health care agencies located at in Maharashtra state where the sample was drawn for the research study”.

d. Hypothesis

H01: There is no significant difference between pre-test and post-test knowledge scores on umbilical cord blood banking among staff nurses at selected tertiary care hospital Maharashtra State.

H02: There is no significant association between post-test knowledge scores on umbilical cord blood banking and selected demographic variables of staff nurses.

e. Delimitations: The study was limited to,

- Assessment of knowledge
- 110 staff nurses
- Tertiary care hospitals of Maharashtra region

f. Ethical Aspect

The study was approved by the Institutional Ethical Committee and the study will be conducted in accordance with the ethical guidelines prescribed by Central Ethics Committee on Human Research.

g. Review of Literature

The review of literature is done under following areas

1. Literature related to anatomy and physiology of Placenta and umbilical cord
2. Literature related to general information of umbilical cord blood banking
3. Literature related to procedure and benefits of umbilical cord blood banking
4. Literature related to knowledge regarding umbilical cord blood banking

h. Conceptual Framework

Ludwig Von Bertalanffy general systems theory was used to assemble the key concepts in a rational scheme. The system of this framework consists set of interacting components; input, Throughput, output and feedback.

Methodology

- Research approach- Quantitative research approach
- Research design- A pre-experimental design with one group pre-test post-test design
- Setting of the study-The study is conducted in selected tertiary care hospital.
- Research variable- The dependent variable is knowledge of staff nurses serving at tertiary care hospital and Independent variable is STM on umbilical cord blood banking
- Demographic variables- Age in years, Education, area of residence, years of experience, religion, source of information and source of knowledge.
- Population – Staff nurses
- Target population - Entire Staff nurses serving at selected tertiary care hospital
- **Accessible population:** Staff nurses serving at selected tertiary care hospital

Sampling

- **Sample size:** 110 staff nurses
- **Sampling technique:** purposive sampling technique
- **Sampling criteria**
- **Inclusion criteria**

The criteria that specify characteristics that a population does have.

1. Staff nurses those who are willing to participate in the study

2. Staff nurses those who are available at the time of data collection.

Exclusive criteria

Those who had attended any similar type of training \ workshop on UCBB

Description of Tools

1. **Section I:** Semi structured questionnaire on demographic variables.
2. **Section II:** Self Structured Questionnaire on knowledge regarding umbilical cord blood banking.

▪ **Validity**

For Content validity. The tool was given to 10 experts; including obstetrics and gynaecology experts, Medical surgical subject experts, Statistician and language experts. Out of this 8 were received. Valuable suggestions were given and necessary corrections were made. The experts include: 5 Obstetrics and Gynaecology Subject Experts, 1 Medical Surgical Specialist, 1 Language Expert, Statistician.

▪ **Reliability**

In this study, Karl Pearson correlation coefficient formula was used for reliability. The reliability coefficient “r” of the knowledge questionnaire was 0.8610, calculated by split half method which is more than 0.8 hence the questionnaire was found to be reliable.

▪ **Pilot study**

Pilot study was conducted from 3/1/2025 to 10/1/2025 with the ten percent of the total samples that is 11. Pre-test was conducted on 3/1/2025 and STM was conducted on knowledge regarding umbilical cord blood banking Post test was conducted on 10/1/2025 i.e. seven days after imparting knowledge. Knowledge was assessed by administering the questionnaire. STM (Structured teaching module) was given following the pretest. After giving the STM (Structured teaching module). On seventh day, the knowledge was reassessed by post-test on the same subjects. The collected data was coded, tabulated and analysed by using descriptive statistics (mean, mean percentage, standard deviation) correlation coefficient and to find out the association between the demographic variables and knowledge and practice scores. The data was represented in the form of tables and graphs. The data regarding knowledge of staff nurses was analysed statistically by using paired ‘t’-test. It was found to be significant at 0.05 level.

▪ **Data collection**

After obtaining a formal permission, the investigator has fixed the date and time for data collection. According to tentative schedule, the investigator has visited the tertiary care hospital and collected data from 10.03.2025 to 31.03.2025. The investigator introduced her and explained the purpose of the study and consent was obtained. The questionnaires were distributed to the samples. The questionnaires were completed in the presence of the investigator to avoid contamination and bias in the collection of data.

Results

Section A

Deals with analysis of data demographic of staff nurses at selected city in terms of frequency and percentage

Table 1: Percentage wise distribution of staff nurses according to their selected demographic variables. n=110

Sr. No.	Demographic Variables	No. of nurses	%
1	Age of staff nurses		
	a. 19-23 years	26	23.6%
	b. 24-28 years	42	38.2%
	c. 29-33 years	16	14.5%
	d. 34 & above	26	23.6%
2	Education of staff nurses		
	a. Diploma	56	50.9%
	b. Degree	48	43.6%
	c. PG & above	6	5.45%
3	Residence area of staff nurses		
	a. Urban	82	74.5%
	b. Rural	28	25.5%
4	Years of Working Experience of staff nurses		
	a. 1 -5 years	64	58.2%
	b. 5 -10 years	23	20.9%
	c. 10-15 years	13	11.8%
	d. 15 & above	10	9.09%
5	Religion		
	a.Hindu	21	19.1%
	b.Muslim	14	12.7%
	c.Buddhist	42	38.2%
	d.Others	33	30%
6	Source of information		
	a. Social media posts	42	38.2%
	b. Hospital policies and guidelines	9	8.18%
	c. Personal opinion of colleagues	34	30.9%
	d. Friends and family	25	22.7%
6	Source of knowledge		
	a. Hospital Training	11	10%
	b. Workshop/Seminar	26	23.6%
	c. Journal article	23	20.9%
	d. Others	50	45.5%

Section B

In this section assessment of the pre-test the knowledge of staff nurses on umbilical cord blood banking before intervention.

Table 2: Pre-test frequency and percentage distribution of Staff Nurses. n=110

Level of knowledge	Frequency (f)	Percentage (%)
Very Poor	7	6.36%
Poor	60	54.5%
Average	40	36.4%
Good	3	2.73%
Very good	0	0%
Overall	110	100%

At the time of pre test around 54.5% & 36.4% staff nurses had Poor and average knowledge respectively. Further, it is seen that 6.3% of staff nurses had very poor knowledge. However, none of them had very good level of knowledge.

Table 3: Post-test frequency and percentage distribution of premenopausal women. n=110

Level of knowledge	Frequency (f)	Percentage (%)
Very Poor	0	0%
Poor	0	0%
Average	10	9.09%
Good	65	59.1%
Very good	35	31.8%
Overall	110	100%

At the time of post test revealed that majority 59.1% of staff nurses had good knowledge. Further, it is seen that 31.8% of staff nurses had very good knowledge. Moreover, only 9% of staff nurses had average knowledge after intervention. However, none of them had poor and very poor level of knowledge after intervention.

Section C

Evaluate the effectiveness of structured teaching module on knowledge regarding umbilical cord blood banking among staff nurses

Table 4: The effectiveness of structured teaching module on knowledge regarding umbilical cord blood banking. n=110

Assessment	Mean knowledge	SD	Mean Difference	t-value	p-value
Pre-Test	11.3	3.55	11.6±0.57	25.55	0.0001S, p<0.05
Post Test	22.90	2.98			

S=Significant

Paired ‘t’ test was used to test the significance of difference between the pre- test and post-test knowledge scores of staff nurses. The data presented in Table shows the significant ‘t’ value. These findings highlight the effectiveness of Structured Teaching Module in increasing the knowledge of the staff nurses regarding UCBB.

Hence, the hypothesis

H₀₁: There is no significant difference between the pre-test and post-test knowledge scores on Umbilical Cord Blood Bank among Staff nurses, is rejected.

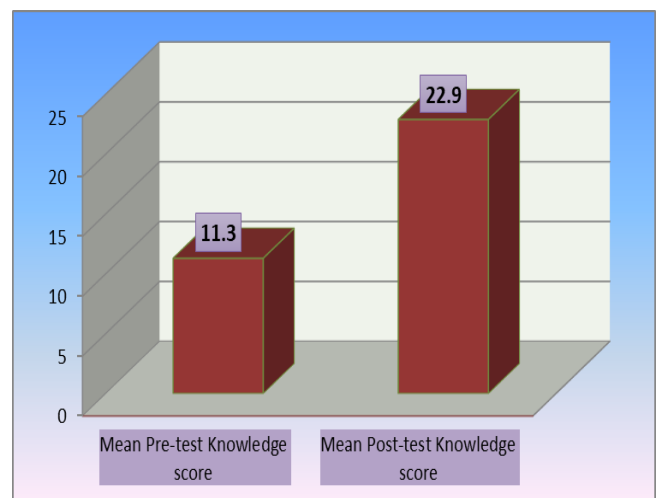


Fig 4: Comparison of mean knowledge scores among staff nurses before and after intervention

Section D

To find out post-test the association of premenopausal women with selected demographic variable.

Table 4: Association of post-test knowledge scores on Umbilical Cord Blood Bank with selected demographic variables of Staff nurses *n=110*

Sr. No	Demographic Variable		Level of Knowledge					χ ² value	P Value
			Very Poor	Poor	Avg.	Good	Very good		
1	Age of staff nurses	19-23 years	0	0	4	16	6	10.387	0.5820 NS; p >.05 (df=12)
		24-28 years	0	0	4	25	13		
		29-33 years	0	0	0	6	10		
		34 & above	0	0	2	18	6		
2	Education of staff nurses	Diploma	0	0	6	36	14	3.183	0.9223 NS; p >.05 (df=8)
		Degree	0	0	4	25	19		
		PG & above	0	0	0	4	2		
3	Residence area of staff nurses	Urban	0	0	8	50	24	1.009	0.9084 NS; p >.05 (df=4)
		Rural	0	0	2	15	11		
4	Years of Working Experience of staff nurses	1 -5 years	0	0	4	36	24	9.318	0.6755 NS; p >.05 (df=12)
		5 -10 years	0	0	1	15	7		
		10-15 years	0	0	2	9	2		
		15 & above	0	0	3	5	2		
5	Religion	Hindu	0	0	4	10	7	5.479	0.9400 NS; p >.05 (df=12)
		Muslim	0	0	0	8	6		
		Buddhist	0	0	4	25	13		
		Others	0	0	2	22	9		
6	Source of information	Social media posts	0	0	7	22	13	5.713	0.9298 NS; p >.05 (df=12)
		Hospital policies and guidelines	0	0	0	5	4		
		Personal opinion of colleagues	0	0	2	22	10		
		Friends and family	0	0	1	16	8		
7	Source of knowledge	Hospital Training	0	0	0	6	5	8.954	0.7068 NS; p >.05 (df=)
		Workshop/Seminar	0	0	2	13	11		
		Journal article	0	0	2	11	10		
		Others	0	0	6	35	9		

NS=Not Significant

Chi- square test was used to find out the association between post-test knowledge scores on Umbilical Cord Blood Bank and selected demographic variables of Staff nurses. The finding of Chi-square test value shows that there is no significant association ($p>0.05$) between post-test knowledge scores and selected demographic variables like Age of staff nurses, Education of staff nurses, Residence area of staff nurses, Years of Working Experience of staff nurses, Religion, Source of information, and Source of knowledge.

Therefore, the hypothesis;

H₀₂: There is no significant association between post-test knowledge scores on Umbilical Cord Blood Bank and selected demographic variables of Staff nurses, is accepted.

Discussion

The present study was aimed to “To find out effect of Structured Teaching Module (STM) on Umbilical cord blood banking among staff nurses serving at tertiary care hospital, Maharashtra.”

In this study, the findings revealed that, Pre-test, 2.73 % of the staff nurses had well, 36.4% of the staff nurses had average, 54.5% had poor and none of them had excellent and very good. Hence, it was interpreted that the pre-test score of staff nurses was more in average. Post-test, 31.8% of the staff nurses had excellent, 59.1 % of the staff nurses had very well, 19.23 % had well and 9.09 % had average and none of them had poor knowledge. Hence, it was

interpreted that the post test score of staff nurses was more very good, good and excellent. Hence it is statistically interpreted that the STM on overall and area wise knowledge score regarding Umbilical cord blood banking among staff nurses was effective. Thus, the H₀₁ is rejected.

There is a no significant difference between pre-test and post-test knowledge scores interpreting effectiveness of STM on knowledge regarding UCBB among staff nurses in selected tertiary care hospital, Maharashtra. Mean and standard deviation values are compared paired ‘t’ is applied at 5% level of significance. It is interpreted that the tabulated t-value for $n=110-1$ i.e. 109 degrees of freedom was 1.9. The calculated ‘t’ value is 25.55 much higher than the tabulated value at 5% level of significance for all the areas of knowledge score. Hence the findings of the study shows that STM on UCBB were effective and statistically significant.

Conclusion

After the detailed analysis, of this study leads to the following conclusion : Effect of STM on umbilical cord blood banking among staff nurses was found to be effective in improving the knowledge of subjects. Its show association in relation to their demographic variables. Hence, based on the above finding, it was concluded undoubtedly that the written prepared material by the researcher in the form of planned teaching helped the subjects to improve their knowledge on umbilical cord blood banking among staff nurses at selected tertiary care hospital.

