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Investigator

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## **ABSTRACT**

### **Introduction:**

Umbilical cord blood is used as a source of hematopoietic stem cells for bone marrow transplantation in the treatment of malignant and nonmalignant disease. Many serious or life-threatening diseases have already been treated with cord blood, so storing the cord blood is a once in life time opportunity, it knocks just once. It is now possible to store cord blood to a public bank or store it in a private bank for future use. The Obstetric and Gynaecology nurses must know about the value of cord blood storage, who are in contact with the pregnant patient and her family.

### **Objective :**

The over all aim of the study was to find the effectiveness of structured teaching programme on cord blood banking among staff nurses by comparing the pre and post knowledge score.

### **Methodology:**

The research design selected for the study was quasi experimental one group pretest and post test design. A random sampling technique was followed to obtain a sample of 30 staff nurses. A structured knowledge questionnaire regarding cord blood banking was prepared and used for the data collection. During the data collection, pretest was conducted on the first day, followed by structured teaching regarding cord blood banking was given.

Finally, post test was done on the seventh day for the same staff nurses using the same questionnaire in the same manner.

### **Results:**

The major study findings were noted as follows,

The data were analyzed using both descriptive and inferential statistics. The pretest mean score was  $12.8 \pm 1.64$ ; the post test mean score was  $23.8 \pm 2.44$ . 't' test was used to evaluate the effectiveness of the structured teaching programme at 0.05 level. It was found that the t test value was statistically significant at  $p < 0.05$  level (  $t = 28.8$ ). In the present study there was no association between the knowledge level of staff nurses and demographic variables.

### **Conclusion:**

Based on the study findings following conclusions were drawn. The level of knowledge on cord blood banking among staff nurses has increased after structured teaching programme and was significant at 0.05 level. There was no significant association found between the level of knowledge and selected demographic variables.

## APPENDIX I

### LIST OF EXPERTS FOR TOOL VALIDATION

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St.Xaviers Catholic college of nursing

Chunkankadai.

**2. Mrs.Suguna , MSc(N) ,Professor**

Vice principal

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valliyoor.

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Kanyakumari.

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Department of OBG

Dr. SMCSI college of Nursing

Karakonam, Trivandrum.

## APPENDIX-II

### EVALUATION CRITERIA CHECK LIST FOR VALIDATION

#### Introduction

The expert is requested to go through the following criteria for the evaluation. Three columns are given for response and a column for remarks. Kindly place a tick mark in the appropriate column and give remarks.

Interpretation columns

Column 1- Meets the criteria

Column 2- Partly meets the criteria

Column 3- Does not meet the criteria

S.No	Criteria	I	II	III	Remarks
1.	Scoring <ul style="list-style-type: none"><li>➤ Appropriateness</li><li>➤ Adequacy</li><li>➤ Accurateness</li><li>➤ Clarity</li><li>➤ Simplicity</li></ul>				
2.	Content <ul style="list-style-type: none"><li>➤ Organization<ul style="list-style-type: none"><li>• Logical</li></ul></li></ul>				

	<ul style="list-style-type: none"> <li>• Continuity</li> <li>➤ Adequacy</li> <li>➤ Appropriateness</li> <li>➤ Relevance</li> </ul>				
3.	<p>Language</p> <ul style="list-style-type: none"> <li>➤ Appropriateness</li> <li>➤ Clarity</li> <li>➤ Simplicity</li> <li>➤ Concise</li> <li>➤ Precision</li> </ul>				
4.	<p>Practicability</p> <ul style="list-style-type: none"> <li>➤ Is it easy to score</li> <li>➤ Does it precisely measure</li> <li>➤ The skill</li> <li>➤ Utility</li> </ul>				

Any other suggestion

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Signature

Name, designation

Address.

## APPENDIX III

### SECTION-A

#### DEMOGRAPHICAL VARIABLE:

Name:

Sample

No:

Place:

1.Age

a)21-25 Years

b)26-35 Years

c)above 35 Year

2.Experience

a)1-5 Years

b)5-10 Years

c)above 10 Years

3.Education

a)GNM

b)BSc(N)

4.Field of Experience

a)obstetrics and gynecology ward

b)medical ward

c)surgical ward

## SECTION:B

### QUESTIONNAIRE TO ASSESS THE LEVEL OF KNOWLEDGE ON CORD

#### BLOOD BANKING:

( Note: Each statement is given with the choices. Each correct answer carries one mark)

1. What do you mean by cord blood banking?
  - A. Collection and preservation of cord blood
  - B. Collection of cord blood
  - C. Preservation of cord blood
  - D. Storage of cord blood
  
2. What does the umbilical cord blood (UCB) contain?
  - A. Stem cells
  - B. neurons
  - C. stem cells with neurons
  - D. nephrons
  
3. What is the composition of 100ml unit of cord blood?
  - A. 1/10 number of nucleated cells and CD<sub>34</sub> + cells
  - B. 1/2 number of CD<sub>34</sub> + cells
  - C. 1/4 number of CD<sub>34</sub> + cells
  - D. 1/3 number of CD<sub>34</sub> + cells
  
4. What do you mean by stem cells?
  - A. Makes new blood cells and replaces the old cells
  - B. Do not make new blood cells
  - C. Multiplies the old cells
  - D. Makes new blood cells and does not replaces the old cells

5. What is the other name of stem cells?
- A. Hematopoietic blood forming cells
  - B. Cancer cells
  - C. Curing cells
  - D. Destruction cells
6. What are the diseases which stem cells can help to cure?
- A. Leukemia and platelet abnormalities
  - B. Metabolic disorders
  - C. Urinary system disorders
  - D. Gastric tract disorders
7. Which one of the following is an advantage of umbilical cord blood transplantation ?
- A. Improves the haemoglobin level
  - B. Purifies the blood
  - C. Decreases the bilirubin level
  - D. Lower incidence of acute graft versus host disease
8. Which of the below characteristics are needed for a staff nurse to practice in umbilical cord blood collection?
- A. Communication, observation and co-ordination
  - B. Planning, observation and training
  - C. Co-operation, supervision and planning
  - D. Training, experience and proficiency
9. What is the source that a staff nurse can gain knowledge on umbilical cord blood collection?
- A. School teachers
  - B. Clients relatives
  - C. X-ray technician
  - D. Inservice education



10. Who collects the cord blood?
- A. Staff nurse
  - B. Lab technician
  - C. Staff assistants
  - D. Lab assistants
11. When do you inform the cord blood bank about umbilical cord blood collection?
- A. 6 weeks or more before delivery
  - B. Less than 6 weeks before delivery
  - C. Less than 4 weeks before delivery
  - D. Less than 2 weeks before delivery
12. What is autologous cord blood transplants?
- A. Cord blood stored and used for family members
  - B. Cord blood stored and used for friends
  - C. Cord blood stored and used world wide
  - D. Cord blood stored at birth and used for ones own use
13. Which one of the following is carried out on the maternal blood before umbilical cord blood collection?
- A. Blood culture
  - B. Urine culture
  - C. Blood urea nitrogen
  - D. HIV
14. Who controls the use of the preserved cord blood stem cell?
- A. Until the child is of legal age the parents or guardian
  - B. Donor after attaining legal age
  - C. Both A and B
  - D. Donor before attaining legal age

15. What are the tests can be done on the collected cord blood?
- A. Coombs test, Rh grouping and serum bilirubin
  - B. Coombs test, blood culture and Hb level
  - C. Total count, differential count and Erythrocyte sedimentation rate
  - D. Rh grouping, blood culture and CD 34 count
16. When and from whom should the consent be signed?
- A. Before labour and from mothers
  - B. After labour and from mothers
  - C. Before labour and from relatives
  - D. After labour and from relatives
17. Who directs the day- to- day activity of the bank?
- A. Doctors on the boards
  - B. Researchers involved in the lab
  - C. Staff nurses
  - D. Lab technician
18. which among the following should be followed during transportation of the cord blood to the bank?
- A. Maintain the room temperature
  - B. Keep the sample in a truck which is closed
  - C. Keep the sample in cargo portion of a plane where it can freeze
  - D. Keep in closed container
19. Which one of the following umbilical cord blood bank is near to Kanyakumari?
- A. Credence hospital
  - B. Life cell international
  - C. Jeevan blood bank
  - D. Cryo bank

20. The procedure of collecting the cord blood is

- A. Simple and painless
- B. Complex and painful
- C. Simple and painful
- D. Complex and painless

21. Which one of the below is the public cord blood bank?

- A. Life cell India
- B. Baby cell India
- C. Jeevan blood bank
- D. Reliance life sciences Pvt Ltd

22. What is the cost of collection and preservation of cord blood in private bank?

- A. Rs 75000
- B. Rs 50000
- C. Rs 25000
- D. Rs 40000

23. How long does it take to collect the blood from the umbilical cord?

- A. 10 minutes
- B. 15 minutes
- C. 30 minutes
- D. 5 minutes

24. What is the method used for the collection of cord blood?

- A. Withdrawing the blood with needle attached to bag
- B. Cutting the cord and pouring the blood
- C. Collecting directly into a test tube
- D. Collecting directly into a syringe

25. What storage container is used in cord blood collection?

- A. Vial and bag storage method
- B. Test tube
- C. Vial method
- D. Syringe method

26. What is the quantity of blood withdrawn from the umbilical cord initially?

- A. 60 ml- 100 ml
- B. Less than 60 ml
- C. More than 100ml
- D. More than 200ml

27. What type of nitrogen is used for freezing?

- A. Liquid nitrogen
- B. Vapour nitrogen
- C. Gaseous nitrogen
- D. Solid nitrogen

28. How the blood samples are preserved?

- A. Separate freezer
- B. With other medical sample
- C. With blood samples
- D. With culture samples

29. How is umbilical cord blood preserved?

- A. As a whole
- B. Depletes red cells and plasma
- C. Removing mononuclear white blood cell fraction
- D. All the above

30. Within how many hours should the cord blood be preserved?

- A. Within 48 hours of birth
- B. Within 24 hours of birth
- C. Within 6 hours of birth
- D. Within 2 hours of birth

ANSWER KEY:

1. a

2. a

3. a

4. a

5. a

6. a

7. d

8. d

9. d

10. a

11. a

12.d

13.d

14.c

15.d

16.a

17.a

18.a

19.a

20.a

21.c

22.a

23.a

24.a

25.a

26.a

27.a

28.a

29.d

30.a

### **Scoring Technique**

It consist of 30 questions to assess the knowledge on cord blood banking among staff nurses. Each correct answer carries one mark and total score is 30.

### **Grading**

≤ 50% : Inadequate knowledge

51 – 75% : Moderately adequate knowledge

Above 75% : Adequate knowledge.

## CHAPTER –I

### INTRODUCTION

**“ The science of today is the technology of tomorrow”**

**Edward teller**

Day by day there are lot of changes in science. Scientists have revealed a new avenue for harvesting stem cells from cord blood. The new findings, however, identify a small population of cord blood cells with the characteristics of more primitive stem cells that have the potential to produce a greater variety of cell type.

( Science daily ,2006)

Cord blood is the blood taken from the umbilical cord and placenta after birth. It contains cells called haematopoetic stem cells that can be used to treat diseases of blood and immune system.

(Angali Kaimal, 2009)

A cord blood bank is a facility which stores umbilical cord blood for future. Both Private and Public cord bank have developed since mid to late 1990's .The first successful cord blood transplantation was done in 1989 in a child with fanconi anemia. Approximately 14,000 unrelated cord blood



transplantations have been performed and 100 autologous transplantation have been performed.

(Haller. M.J, 2010)

A Baby can be bestowed with love, money virtually anything. But storing its cord blood is a once in life time opportunity in the real sense. It knocks just once when the baby is born.

(Anu Radha Madhavan 2010)

The umbilical cord blood preservation bank focus on bringing the life saving biological insurance policy to nationwide and internationally. It explains that Obstetric and Gynaecology nurses must know about the value of cord blood storage, who are in contact with the pregnant patient and her family.

(Geffrey John O Nill, 2011)

Laughtin et al ,(2006) conducted a study in Ohio among 68 patients with leukemia or with other blood disorders . Most of the patients received transplants of umbilical cord cells from unrelated donars. About 90% of the patient grew new healthy blood cells. Only 20% of the patient developed severe immunity problems compared to 55% of the patient who developed sub problem after receiving perfectly matched bone marrow. It is thought that

because the umbilical cords are immature immunological, they adapt to the patient's body than mature bone marrow.

Dine .H et al (2009) conducted a study in 334 pregnant women in Istanbul. The majority of the participants had lack of knowledge about stem cells and cord blood banking and wanted more information.

### **Significance and need for the study**

Cord blood banking is a revolutionary method that preserves stem cells from the umbilical cord, so banking cord blood cells at birth is like storing potential medication for use in future if and when needed. It is like securing the baby with biological insurance

(Srinivasan, 2011)

Cancer is the second biggest cause of death in India, growing at 11 percent annually. There are 2.5 million cancer cases and 4 lakhs death a year in India. In 1991,6 lakhs new cases were diagnosed that has now risen to 8 lakhs . Worldwide cancer accounting for 1.2 million new cases annually in which malignant non-Hodgkin lymphomas accounts 290,000; leukemia accounts 250,000; nervous system accounts 175,000; Hodgkin disease accounts 62,000 cases.

(WHO, 2010)

In India approximately 42,434 birth occurs daily, which results in discarding 42,434 umbilical cord a day. So the storage of stem cells derived from umbilical cord can prove to be best possible insurance against life threatening disease.

(Estimated population, January, 2012)

Recent estimates suggest in India, about 25,000 cord blood banks have been started in the past three years. The concept of stem cell banking in India is to use or mitigate 80 diseases through stem cells.

(Nancy Singh, 2011)

The Hindu (September, 2010) Newspaper reported that 1500 stem cells are received every month in India.

Approximately 400,000 cord blood banks were started worldwide , 14,000 unrelated cord blood transplants have been performed for patients with hematologic malignancies and bone marrow disorders.

(Karren Ballen, 2009)

A study was conducted in Halifax among 444 women. 70% reported poor or very poor knowledge about cord blood banking ,68% reported that physician should educate about the collection of cord blood ,70% preferred prenatal classes. Most of the women in this study supported the donation of

cord blood to public cord blood for potential transplantation and research.(Dr. Concad .V, Fernandez et al 2003)

Outcomes of unrelated donors cord blood transplantation in 191 hematologic malignancy children , enrolled between 1999 and 2003 were studied in North carolina. 77% were high risk diseases and a good performance status score of 84% occurred.

(Joanne Kurtzberg et al , 2002)

### **Statement of the problem**

A study to assess the effectiveness of structured teaching programme on cord blood banking among staff nurses in Sree Mookambika Medical College hospital at Kanyakumari district.

### **Objectives of the study**

1. To assess the level of knowledge of staff nurses before and after structured teaching programme on cord blood banking using structured questionnaire.
2. To determine the effectiveness of structured teaching programme on cord blood banking by comparing the pre and post test knowledge score.

3. To determine association between the pre test knowledge score of staff nurses on cord blood banking with their demographic variables ie age, education ,field of experience and years of experience .

### **Hypotheses**

1. There is a significant improvement in the knowledge level of staff nurses on cord blood banking after structured teaching program.
2. There is a significant association between the level of knowledge regarding cord blood banking among staff nurses with the selected demographic variables such as age, education ,field of experience and years of experience .

### **Operation definition**

#### **1. Staff nurses**

In this study staff nurses refers to the nurses working in Sree Mookambika Medical College Hospital with the qualification of diploma in nursing or a degree in nursing.

#### **2. Effectiveness**

In this study effectiveness refers to the improvement in the level of knowledge of staff nurses on cord blood banking after attending the structured teaching program and assessed by knowledge assessment questionnaire.

### **3. Structured teaching programme**

In this study Structured teaching programme refers to the teaching material on cord blood banking which is prepared and presented by the researcher in one session to improve the knowledge of staff nurses with the help of booklet and LCD(definition ,storage ,preservation ,banking method).

### **4. Cord blood banking**

Cord blood banking refers to the collection and preservation of cord blood for the treatment of many disorders that may occur in the future.

### **Assumptions**

1. Knowledge of staff nurses on cord blood banking may be inadequate before structured teaching programme.
2. Structured teaching programme may increase the knowledge on cord blood banking among staff nurses.
3. General public is not aware of cord blood banking.
4. Nurses can guide the family for donating and storing cord stem blood.

**Delimitations**

1. The study is limited to 30 samples only
2. Period of study is only one month
3. Samples were drawn from only one setting .
4. Knowledge aspects only assessed

**Ethical consideration**

The Research proposal was approved by the college dissertation committee. The study was conducted in Sree Mookambika medical college hospital, Kulasekharam after getting permission from the Chairman, Director and nursing superintendents. Informed consent was obtained from each participant before conducting the study. Confidentiality was maintained.

**Conceptual framework**

The conceptual framework is a global ideas about concept in relation to specific discipline. The overall purpose is to make research findings meaningful and generalizable.

The conceptual framework for this study was derived from “ Modified J.W. Kenny’s Open System Model (1990) ” interrelated parts in which parts have a function and system as a whole has its own function:- all living systems are open system in which there is a continuous exchange of matter,

energy and information provides input for the system. The system transforms the input in the process known as output. When output is returned into the system as input the process known as feed back.

### **Input**

Input is the entry of knowledge regarding cord blood banking among staff nurses .It must be conducted after the pre test.

### **Throughput**

Throughput is the process of transformation within oneself.

### **Output**

The information are continuously processed through system and released as output in an altered state. Output usually focuses upon the learning outcome of the participants.

Input is assessed by knowledge level of the staff nurses through the structured questionnaire. Throughput was the transformation process which is obtained by delivery of structured teaching programme. Output is assessed through the post test using same questionnaire.



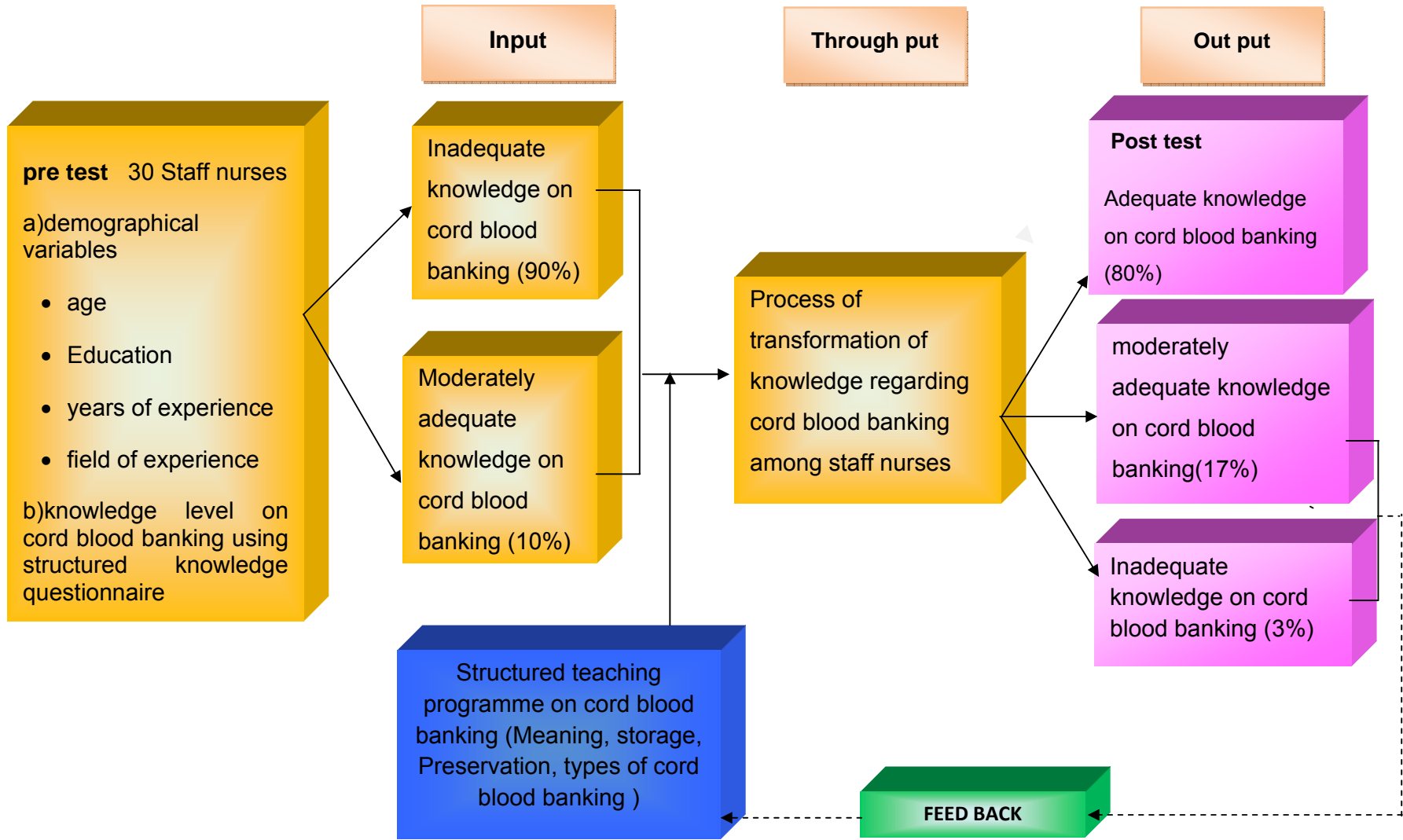


Fig. 1. Conceptual Frame Work based on Modified J.W. Kenny's open System Model

## CHAPTER-II

### REVIEW OF LITERATURE

Nursing research is a continuous process in which knowledge is gained from earlier studies. A literature review helps to lay the foundation.

Review of studies on knowledge of umbilical cord blood banking on staff nurses are divided into following headings.

- Studies related to knowledge of umbilical cord blood banking among mothers
- Studies related to umbilical cord blood transplantation
- Studies related to the knowledge of umbilical cord blood in medical professionals

#### **1. Studies related to knowledge of umbilical cord blood banking among mothers**

Gregory-Katz et al, 2011 conducted a study to assess the knowledge and attitude of pregnant women towards cord blood banking in 5 European countries. 79% of pregnant women had little awareness of cord blood banking, 58% of women had heard of the therapeutic benefits of cord blood, 21% received information from midwives and obstetricians, 72% choose to donate to public bank, 12% choose a mixed bank, 12% to private bank, 92% would donate their child's cord blood to research when it is not suitable for

transplantation. The study concluded that pregnant women has lack of knowledge on cord blood banking and attitude of pregnant women are not an obstracle to the rapid expansion.

Stephen Sik hung Sken, 2011 conducted a study in hong kong to assess the knowledge on commercial cord blood banking among pregnant women . 2000 women were taken, 1866 (93.3%) completed the knowledge questionnaire. The majority 78.2% had no idea that there was the chance of using self stored stem cells, Only 20.3%women knew that stem cells are available from Red Cross in case their children need hematopoetic cell transplantation. The results of the study revealed inadequate knowledge on umbilical cord blood stem cell banking and its applications .

Palten PE, Dudenhausen JW, 2010 conducted a study in Berlin to asses the knowledge regarding umbilical cord blood banking (UCBB) among pregnant women . Total of 300 questionnaires were evaluated, three quater of the population had heard of umbilical cord blood banking, but most had no further knowledge about the method and only one third of interviewed women were informed about certain diseases had treated by umbilical cord blood and 50-65% did not know how to answer the questions. The results of the study revealed great lack of knowledge on umbilical cord blood stem cell banking among pregnant women.

O. Hassall et al, 2007 conducted a study in Mombasa, Kenya to estimate the acceptability of donation and transfusion of umbilical cord blood

for severe anaemia in young children. 180 women completed the questionnaire. Donation and transfusion of cord blood were accepted to 81% and 78% respectively, 90% women supported cord blood donation, 77% women wanted informed consent to be sought for cord blood donation and 66% of them felt they could make this decision alone. The study concluded that donation and transfusion of umbilical cord blood are acceptable to majority of women.

Perlow JH, 2006 conducted a study in Phoenix to determine patients knowledge of umbilical cord blood banking (UCBB). 425 patients were taken, 37% has no knowledge of umbilical cord blood banking ,71%of patients were not planned for umbilical cord blood banking because of expense and insufficient knowledge, 2.6% were extremely knowledgeable and same wise 75% were minimally informed and only 14% of patients were evaluated about umbilical cord blood banking by their nurse or obstetrician and 90% of patients expected their obstetrician to answer their questions.The study concluded that patients has lack of knowledge and expense remains a barrier to umbilical cord blood banking.

Surbek. DV. et al, 2006 conduted a study in the university of Basel Women's hospital pregnancy outpatient clinic, Germany , to estimate the acceptance of cord blood donation among pregnant mother . 300 questionnaires were handed out to pregnant women of different ethnic background, 250 (83%) returned and 245 was evaluated for final analysis, Only 40% indicated that they did know what usually happens to the placenta

after birth, 95% supported the idea of umbilical cord blood for banking and for later use, 93% stated to donate cord blood for their own child for their purpose. The study concluded the high acceptance of umbilical cord blood donation and stem cell transplantation among pregnant women.

## **2. Studies related to umbilical cord blood transplantation**

Morio. T et al, 2011 conducted a study in Japan to find the outcome of unrelated cord blood transplantation in patients with primary immunodeficiency (PID). 88 patients with primary immunodeficiency was treated with umbilical cord blood transplantation, 5 year overall survival for all patients was 69%. The main cause of death before day 100 was infection. The cumulative incidence of grade 2-4 acute graft versus host disease at day 100 was 28% of that of chronic acute graft versus host disease at day 180 was 13%. Using multivariate analysis pre transplant infection, no conditioning, Human lymphocyte antigen mismatching were associated with poor prognosis. The study concluded that should be considered for primary immune deficiency patients with out Human lymphocyte antigen matched sibling and control of pre transplant infection and selection of Human lymphocyte antigen matched donors will lead to a better outcome.

Wan-Zhang Yang et al, 2011 conducted a study in Japan to find umbilical cord blood-derived mononuclear transplantation for the treatment of hereditary Ataxia. 30 patients suffering from hereditary ataxia was treated with cord blood mononuclear cells systematically by intravenous infusion and

intrathecally by either cervical or lumbar puncture. primary end point are measured with Berg balance Scale (BBS), With treatment, 13/30 berg balance scale improved by 50% and 17/30 showed improvement between 51%~49%. The highest increase was 87.5% while the lowest one was 18.8%. the efficiency rate of balancing from these samples was 100%. The berg balance scale score improvement was significantly elevated after treatment. The study concluded that combination of cord blood mononuclear cell infusion and rehabilitation training is safe and effective treatment for ataxia.

Fang et al, 2011, conducted a study in Chinese children with Beta-Thalassemia to evaluate the factors affecting the outcome of sibling umbilical cord blood transplantation. Retrospective review was undergone. 9 children were diagnosed with Thalassemia was taken. 7 patients had engraftment of donor cells, 2 of 3 patients receiving mismatched cord blood but did not achieve engraftment and Other one engrafted developed grade 4 graft versus host disease, 2 patients subsequently developed secondary graft rejection. 8 patients survived but only four were transfusion independent. The study concluded that Umbilical cord blood transplants have a higher chance of non engraftment and secondary rejection.

Sun J et al, 2010 conducted a study to determine the safety and feasibility of intravenous administration of autologous umbilical cord blood (CB) in young children with acquired neurologic disorders. 184 children received 198 cord blood infusions. These patients had infusion reactions. Median pre-cryopreservation, total nucleated cell count and CD<sub>34</sub> count were

significantly lower than publically stored cord blood, post throw sterility cultures were positive in 7.6% of infused cord blood. The study concluded that IV infusion of autologous cord blood is safe and feasible in young children with neurologic injuries.

Gnera Marquez et al ,2010 ,conducted a study in Mexican institute of social security ,mexico, to find the survival rate after umbilical cord blood transplantation . 589 umbilical cord blood units were stored, 54% of total number of units collected ,48 units were released for transplantation of 36 patients, 26 patients(72%) correspond to patients with acute leukemia, 5 (14%) patients with marrow failure and rest (14%) to patients with hemoglobinopathices and other syndromes. The study concluded that disease free survival rate was 41% and overall survival was 47% with survival periods of 126 to 1654 days.

Herr AL et al, 2010, conducted a study in France to determine the long term follow up and factors influencing outcomes after related identical cord blood transplantation for patients with malignancies. 147 patients with malignancies were taken. Acute leukemia was the most frequent diagnosis, At 5 years non relapse mortality and relapse were 9% and 47% respectively. The study concluded that the probability of disease free survival and overall survival were 44% and 55% respectively and the use of methotrexate as graft verses host disease prophylaxis decreases engraftment.

Rocha.V et al, 2009, conducted a study in Hospital Saint Louis Paris to find the use of umbilical cord blood transplantation in children with malignant and non malignant diseases. 2000 children with malignant diseases have been transplanted with a related (n=199) or unrelated cord blood transplantation (n=1663). outcome after cord blood transplantation have been compared with other alternative allogenic hematopoetic stem cell transplantation. The study concluded that after cord blood transplantation , myloid engraftment is delayed, acute and chronic graft verses host diseases decreased and disease free survival was statistically high.

Yang XF et al, 2009 conducted a study in cell treatment centre, Shenyang, to find the feasibility of employing double transplantation of autologous bone marrow mesenchymal stem cells and umbilical cord Mesenchymal stem cells(UMSC). A total of 82 cases were treated by the double transplantation of bone marrow mesenchymal stem cells(BMSC) and umbilical cord Mesenchymal stem cells(UMSC). They were diagnosed as progressive muscular dystrophy. It was found that 31 cases(37,8.%) obtained a remarkable efficiency,37 cases(45.1) were effective and 14 cases (17.1%) had no change, No adverse reaction was reported during the course of treatment.The study concluded that double transplantation of autologous bone marrow mesenchymal (BMSC)stem cells and umbilical cord Mesenchymal stem cells(UMSC) is convenient, safe, and effective in the treatment of progressive muscular dystrophy(PMD) and can be considered as a new therapy for progressive muscular dystrophy(PMD) .



Barbara Novelo-Garza, 2008, conducted a study in Mexico, to establish cord blood banking and transplantation program. 360 umbilical cord blood units were collected from 2005-2006. Total of 201 units (56%) (minimum volume, 50 ml, without anticoagulant) were processed and stored. 10 units has released for transplantation to 7 patients, Engraftment was observed in 5 patients, 4 of them were still in remission, one patient died, two patient showed no engraftment and died 29 to 30 days after transplant. The study concluded that umbilical cord blood banking and transplantation program will help to improve the already existing transplant programme.

Paul L. Martin et al, 2006 conducted a study in America to evaluate umbilical cord blood transplantation in paediatric patients with lysosomal and peroxisomal storage diseases. 69 patients with lysosomal and peroxisomal storage diseases were taken. All patients' received the same preparative regimen, graft-versus-host disease prophylaxis and supportive care. 69 patients with a median age of 1- 8 years underwent transplantation. 1 year survival was 72%. The cumulative incidence of neutrophil engraftment by day 42 was 78% at a median of 25 days. Grade II to IV acute graft versus host disease occurred in 36% of patients. The study concluded that cord blood transplantation should be considered as frontline therapy for young patients with lysosomal and peroxisomal storage diseases.

Huang YN et al, 2005, Conducted a study in Gnanzhon Maternal-neonatal hospital, China, to analysis unrelated umbilical cord blood transplantation . 54 cases of unrelated cord blood transplantation were

reported, including 43 malignant diseases and 11 non-malignant diseases, retrospective analysis was performed. Acute graft versus host disease was present in 8 patients(21.6%) and chronic graft versus host disease occurred in 2 patients(5.4%), 6 patients suffered from graft failure(11.1%), Median age was 9.5 years, the total survival rate was 42.6%. The study concluded that unrelated umbilical cord blood transplantation seems to be a good substitute for bone marrow transplantation and has good prospects especially in children.

Jun Ooi et al, 2004 , conducted a study in the Institute of Medical Science ,Tokyo, to find unrelated cord blood transplantation (CBT) to treat acute myeloid leukemia . unrelated cord blood transplantation (CBT) for 18 adult patient with de Novo acute myeloid Leukemia (AML) was done. 14 patients were alive and free of disease at between 185 and 1332 days after transplantation. The probability of disease free survival at 2 years was 76.6%. These results suggest that adult acute myeloid leukemia (AML) patients without suitable or unrelated bone marrow donors should be considered as candidate for cord blood transplantation.

Liao .C et al, 2004 conducted a study in china to analyse the effect of multiple cord blood transplantation .A retrospective analysis on multiple cord blood transplantation in 13 cases was done. Unrelated allogenic multi-umbilical cord blood transplantation was performed, Only one case suffered from graft versus host disease(GVHD), the total survival of multi-umbilical cord blood transplantation was 46.2% (6/13). It is concluded that good

prospects in the field of multi-umbilical cord blood transplantation is likely to be realized.

Gywnn D.Hong et al, 2003 conducted a study in American society for blood and marrow transplantation to find the effect of unrelated umbilical cord blood transplantation in adult patients. 57 adult patients with high risk disease was taken and cord blood transplantation was done, 17 patients developed grade II to IV graft versus host disease . The median survival of the entire group was 91 days. 11 patients were alive at a median follow up of 1670 days. The projected 3 year survival is 19%. These results suggest that unrelated umbilical cord blood transplantation is a viable option for adult patients and should be explored in patients with earlier stage disease.

William Reed et al, 2003, conducted a study in Oakland, to analyse a comprehensive banking of sibling donor cord blood for children with malignant and non malignant disease. 540 families from 42 states were taken, Collections occurred at 700 different hospitals, Disease categories for sibling recipients included malignancy, sickle cell anaemia, thalassemia major non malignant hematological conditions and metabolic errors ,17 units have been transplanted, 16 of 17 cord blood allograft recipients had stable engraftment of donor cells. The study suggests the collection of sibling donor cord blood can accomplish a high success rate.

Franco Locatelli, 2003, conducted a study in Italy to analyse the effect of related umbilical cord blood transplantation in patients with thalassemia

and sickle cell anemia. 44 patients were given an allogeneic related cord blood transplant for both thalassemia and sickle cell anemia. The free survival is 79% and 90% for patients with thalassemia and sickle cell anemia. The study concluded that related cord blood transplantation for hemoglobinopathies offers a good probability of success and is associated with a low risk of graft versus host disease.

Gerard Michel et al, 2003, conducted a study in University of Marseille, France, to find effect of unrelated cord blood transplantation in childhood acute myeloid leukemia. 95 children receiving umbilical cord blood transplants for acute myeloid leukemia (AML) were considered. Cumulative incidence of neutrophil recovery was 78%, acute graft versus host disease was 35% and 100th day transplantation related mortality was 20%, leukemia free survival was 42%. The study concluded that umbilical cord blood transplantation is a therapeutic option for children with very poor prognosis acute myeloid leukemia and who lack an human lymphocyte antigen identical sibling.

John E. Wagner et al, 2002, conducted a study at University of Minnesota cancer center to find the effect of unrelated donor umbilical cord blood in malignant and non malignant disease. 102 patients with malignant and non malignant disease were transplanted with unrelated donor umbilical cord blood. 65 were malignant and 37 were non malignant disease. Hematological relapse was detected between 21 and 672 days after transplantation in 21 out of 65 patients with malignant disease. In 28 patients with ALL, the survival

rate was 0.55 for standard risk and 0.32 for high risk patients. Similarly of 26 patients with acute myeloid leukemia( AML), survival rate was 0.33 for high risk patients and 2 of 4 survived with standard risk patients. The result suggest a clear justification for umbilical cord blood banks world wide.

### **3. Studies related to knowledge of umbilical cord blood in medical professionals**

Antonella Brizzolara et al, 2010 conducted a study in Italy to assess the knowledge, comprehensions, opinions, attitudes and choices related to cord blood donation in 7 heterogenous focus groups including pregnant women, future parents, cord blood donars, midwives and obstetricians. The study concluded a large support to cord blood donation and need for better health professionals education in this field.

Ian Thoenley, 2009 conducted a survey in United States and Canada among physician about support to public cord blood banking ,152 paediatric hematopoetic cell transplant physicians were taken and 93 responded . During this study 1000 stem cell transplants had performed , and only 50 were privately banked cord blood . The study concluded that physician supports private cord blood banking unless another member of the family is at risk for a blood diseases that will require a stem cell transplants.

Madd LM, 2008 conducted a study in michen state university to asses the attitude towards facilitation of research on cord blood among clinical staff including 36 office workers,26 nurses,11medical assistants, 6

physicians, 127 delivery staff nurses, 19 support staff, and 10 technician. In this study it was found 72% clinical staffs would hand out brochures, 65% of staffs describes the studies, 44% wanted outside research staff to recruit patients, 84% of delivery room staff collect placenta and 77% collect cord blood and preferred delivery room staff to perform the collections, Lack of time was the reported research barrier and a few refused to facilitate research task. The study concluded that careful planning of research is necessary for successful execution.

Wall DA et al, 1997 conducted a study to evaluate the feasibility of obstetrician-based cord blood collection system for the purpose of banking cord blood for unrelated donor haematopoietic stem cell transplantation. Over 200 delivering physicians and 40 obstetrical units were included. The study result was that obstetrician based cord blood collection network is feasible and advantageous in that cord blood can be collected from a wider variety of communities, thus enhancing the ethnic diversity of a bank.

## CHAPTER III

### RESEARCH METHODOLOGY

#### Introduction

This chapter deals with the research methodology. In this study researcher was intended to assess the effectiveness of structured teaching program on cord blood banking among staff nurses in sree mookambika medical college hospital.

#### Research Approach

The research approach used for this study was quantitative research approach.

#### Research Design

The design used in this study was quasi experimental design. That was one group pre-test post test design. It is represented as

$[O_1 \times O_2]$

O<sub>1</sub>- pretest to assess the level of knowledge .

X - Structured teaching programme regarding cord blood banking.

O<sub>2</sub>- post test to assess the effect of structured teaching

programme regarding cord blood banking.

## **Setting of the Study**

The study was conducted in Sree Mookambika Medical College hospital, kulasekaram. Sree Mookambika Medical College hospital is a 500 bedded multi specialty hospital with good infrastructure and laboratory facilities. Number of out patient per day is approximately 60. The department of obstetrics and gynecology has around 160 inpatient per month. The total number of deliveries per day is 3-4 and the total number of staff nurses working in the hospital are 270. Obstetrics and Gynecological department is well spacious and well equipped with good infrastructure. It consists of family welfare clinic, infertility clinic, ultrasound room, examination room and cancer detection room.

## **Variables**

- Independent variable : structured teaching programme on cord blood banking
- Dependent variable : Knowledge on cord blood banking.
- Demographic variables : Age, Education, Years of experience and Field of experience of staff nurses.

## **Population**

The population for the study were staff nurses from Sree mookambika medical college hospital.



**Sample Size**

Sample consists of 30 staff nurses

**Sampling Technique**

Simple random sampling technique was used for the study.

**Sample Selection Criteria****Inclusion criteria**

1. Staff nurses who are willing to participate in the study.
2. Staff nurses with a degree or diploma in nursing.

**Exclusion criteria**

1. Nurses who have already attended any teaching session related to cord blood banking.
2. Nurses not present at the time of pre test.

**Description of the Tool**

The tool consists of 2 sections

**Section A**

Demographic variable consists of age, education, years of experience and field of experience.

## **Section B**

The structured questionnaire consisted of 30 questions to assess the knowledge on cord blood banking among staff nurses . Each correct answer was given one mark and the highest possible score was 30.

### **Key**

Inadequate knowledge :  $\leq 50\%$

Moderately adequate knowledge : 51-75%

Adequate knowledge :  $> 75\%$

### **Validity and Reliability**

The tool was prepared and submitted to 4 experts in the obstetrics and gynecology nursing and modification was made according to their suggestion.

Reliability of the tool was checked by test- retest ( $r=0.08$ ) method using spearman rank correlation formula.

### **Pilot Study**

The Pilot study was conducted in Dr.Jeyaseharan hospital, Nagercoil.in order to find out the feasibility . The Pilot study was conducted among 6 staff nurses. The period for conducting pilot study was one week and Six staff nurses who fulfilled the selection criteria were selected. The purpose of the study was explained to the subjects and assured the confidentiality of their responses. Pretest was done by using the questionnaire that consist of 30

knowledge questions regarding knowledge on cord blood banking. Then the structured teaching programme was given for the group about one hour. After one week post test was done by using the same questionnaire that consist of 30 knowledge questions regarding knowledge on cord blood banking .

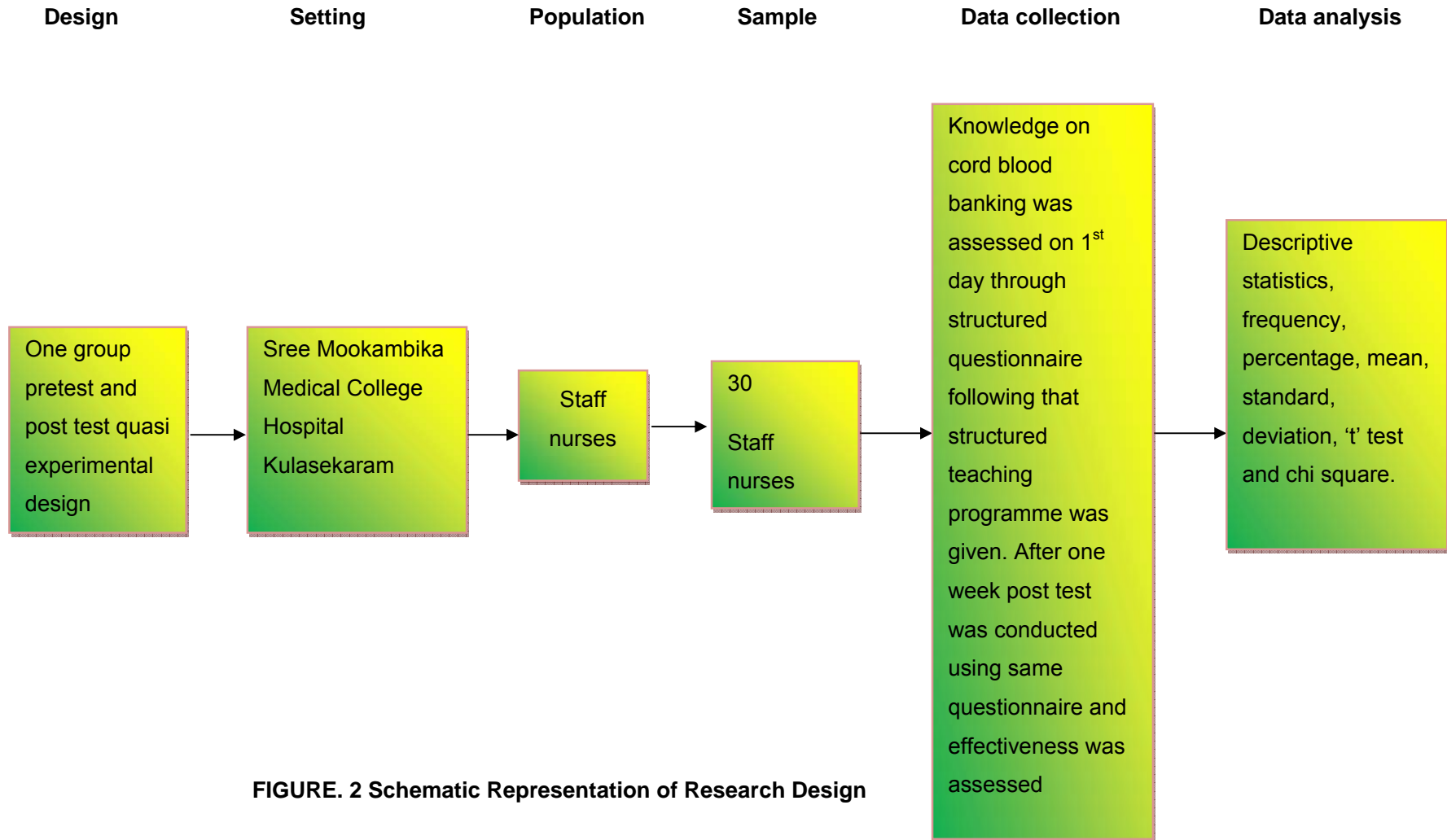
Since the adequacy of the tool was established through the pilot study the final study was conducted without any change in the tool.

### **Data Collection Procedure**

After getting the permission from the concerned authority, the study was conducted. The period of data collection was One month in the month of June. Based on the inclusion criteria the subjects were selected .The attendance register for the staff nurses was obtained from the nursing superintendent and 30 nurses were selected randomly for the study . The name list of 30 nurses was handed over to the nursing superintendent and those nurses were instructed to participate in pre test. The purpose of the study was explained in detail to the selected staffs and assured confidentiality of their responses. The questionnaire consists of 30 questions regarding knowledge on cord blood banking. They were asked to answer the question by choosing the correct one. 30 minutes was allotted for them. Then the structured teaching programme regarding cord blood banking was given to the selected staffs. The teaching module consists of meaning, and details of cord blood banking. Teaching programme was given for about 1 hour by using the LCD and booklet. After one week post test was conducted among the same nurses by using the same questionnaire .

**Plan for Data Analysis:**

The data were organized, tabulated, summarized and plan to be analyzed by using the descriptive and inferential statistical analysis. The analysis would be made by 't' test. The association between the selected demographic variables with pre test knowledge would be analyzed and interpreted by using  $\chi^2$  (chi-square) test.



**FIGURE. 2 Schematic Representation of Research Design**

## CHAPTER IV

### DATA ANALYSIS

This chapter deals with the analysis and interpretation of data collected in accordance with the objectives stated for the study. The data collected was analyzed by using descriptive and inferential statistics.

The analysis and interpretation of knowledge level were made by 't' test. The association between the demographic variables with knowledge level was analyzed and interpreted by  $\chi^2$  (chi square) test. The level of significance was tested at 5%( $p=0.05$ )

The objectives of the study were:

1. To assess the level of knowledge of staff nurses before and after structured teaching programme on cord blood banking using structured questionnaire.
2. To determine the effectiveness of structured teaching programme on cord blood banking by comparing the pre and post test knowledge score.
3. To determine association between the pre test knowledge score of staff nurses on cord blood banking with their demographic variables ie age, education ,field of experience and years of experience.

Findings are grouped and presented under the following heading.

### **Section I**

Description of sample characteristics.

**Table1:** Frequency and percentage distribution of the samples according to their demographic variables.

**Table2:** Frequency and percentage distribution of the samples according to their level of knowledge.

### **Section II**

Effectiveness of structured teaching programme regarding cord blood banking.

### **Section III**

Associations between pre test knowledge score and selected demographic variables.

## Section I

This section deals with the frequency and percentage distribution of the sample according to the demographic variables and the level of knowledge.

**Table.1. Frequency and percentage distribution according to the demographic Variables.**

N=30

S.No	Demographic variables	F	%
1	Age in years:		
	21-25years	14	46
	26-35 years	9	30
	Above35 years	7	24
2	Experience:		
	1-5years	14	46
	5-10 years	9	30
	Above10 years	7	24



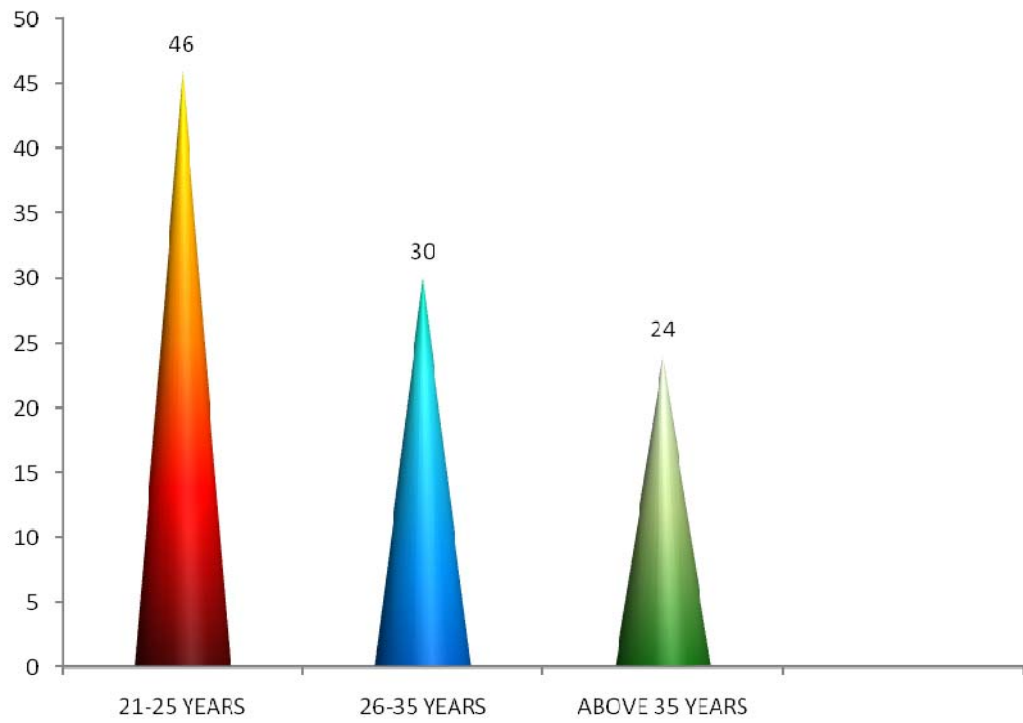
Table 1 continued .....

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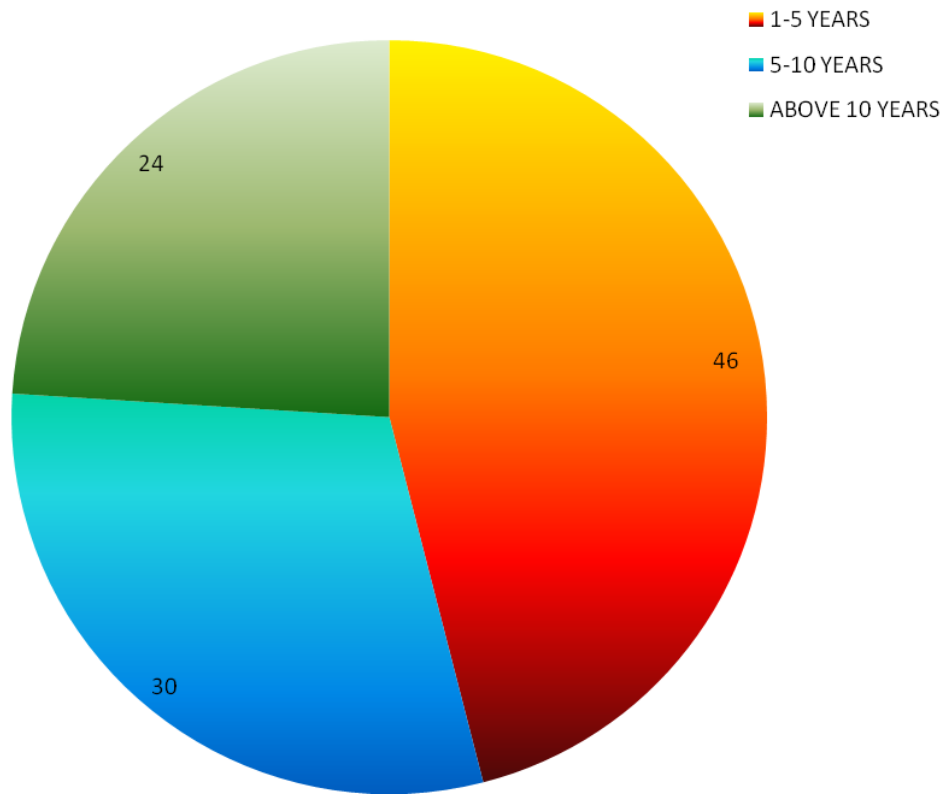
3	Education:		
	GNM	18	60
	Bsc(n)	12	40
4	Field of experience:		
	Obstetrics and gynecology ward	12	40
	Medical ward	10	34
	Surgical ward	8	26

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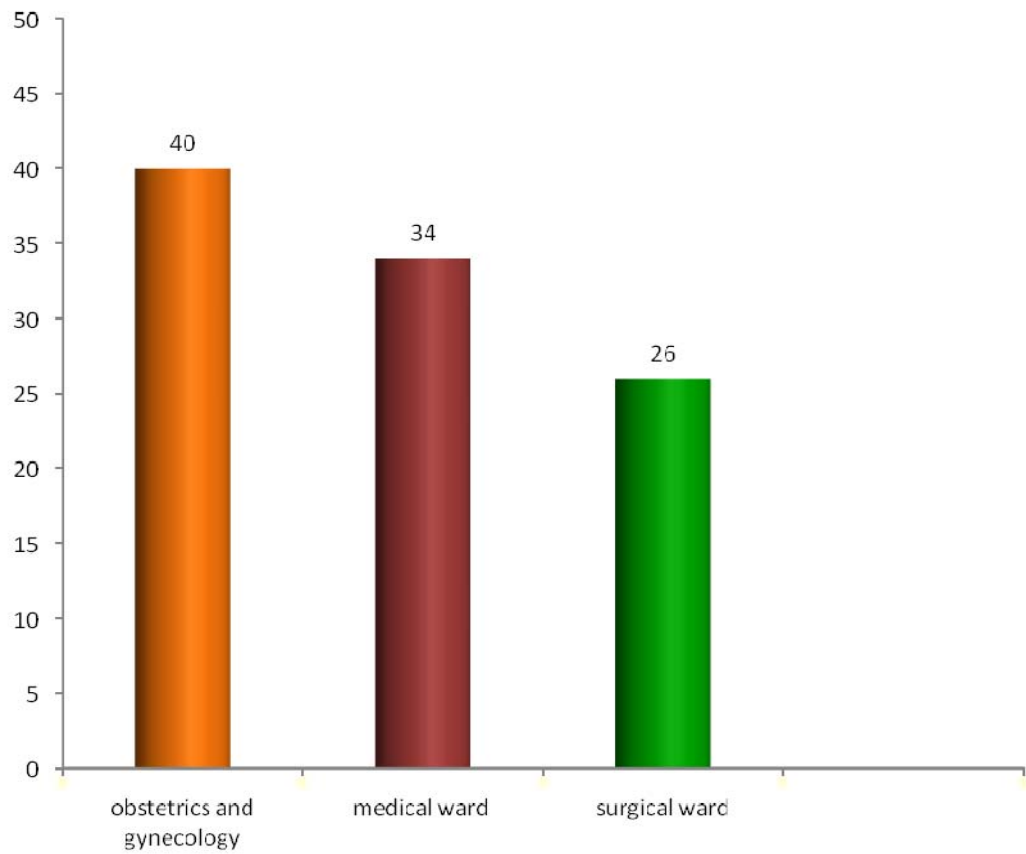
Table 1 shows that the frequency distribution of samples according to their demographic variables, 46% belongs to the age group of 21-25 years, 46% were 1-5 years of experience, 60% were GNM and 64% had experience in obstetric and gynecology ward.



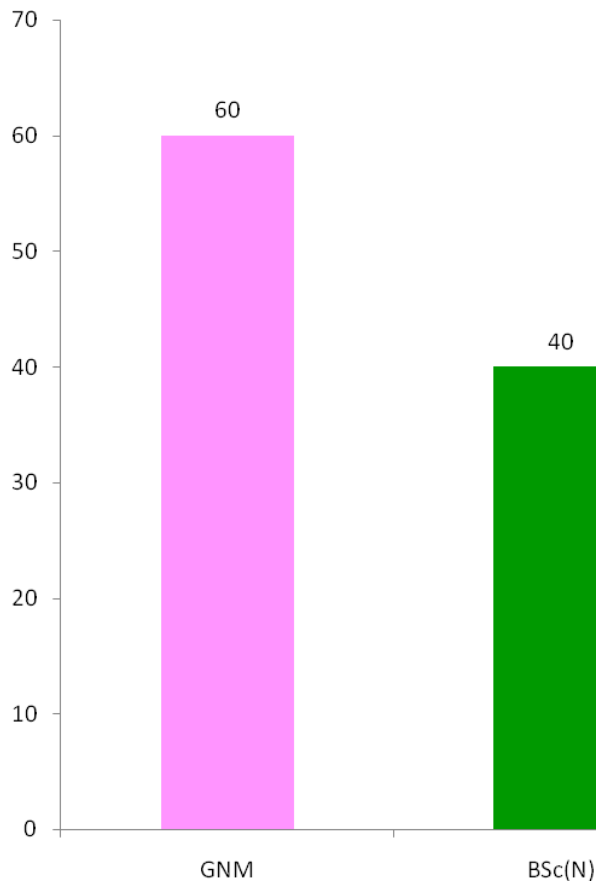
**Fig. 3 (a).** Distribution of demographical variable according to age



**Fig. 3(b). Distribution of demographic variable according to years of experience**



**Fig. 3(c). Distribution of demographic variables according to field of experience**



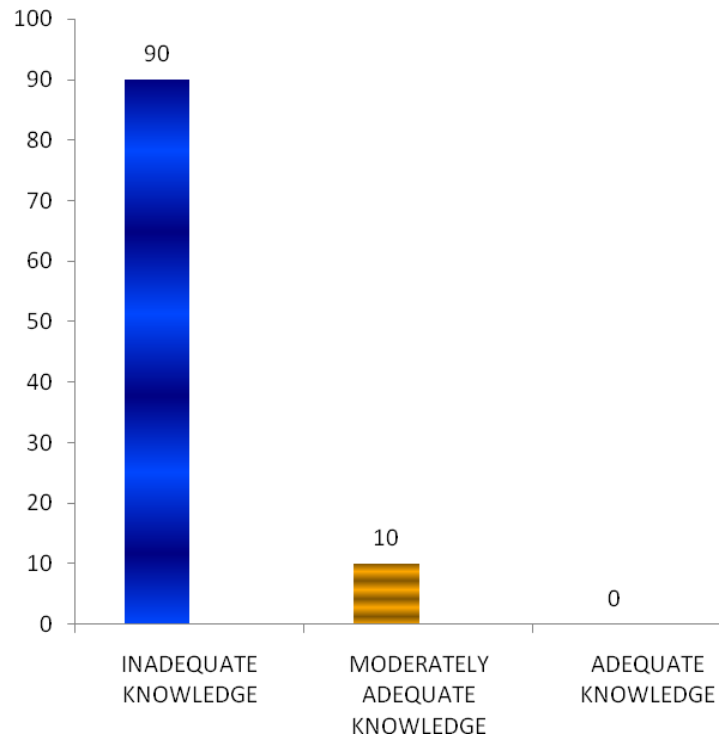
**Fig. 3(d). Distribution of demographic variables according to education**

**Table. 2. Frequency and percentage distribution of sample according to their level of knowledge:**

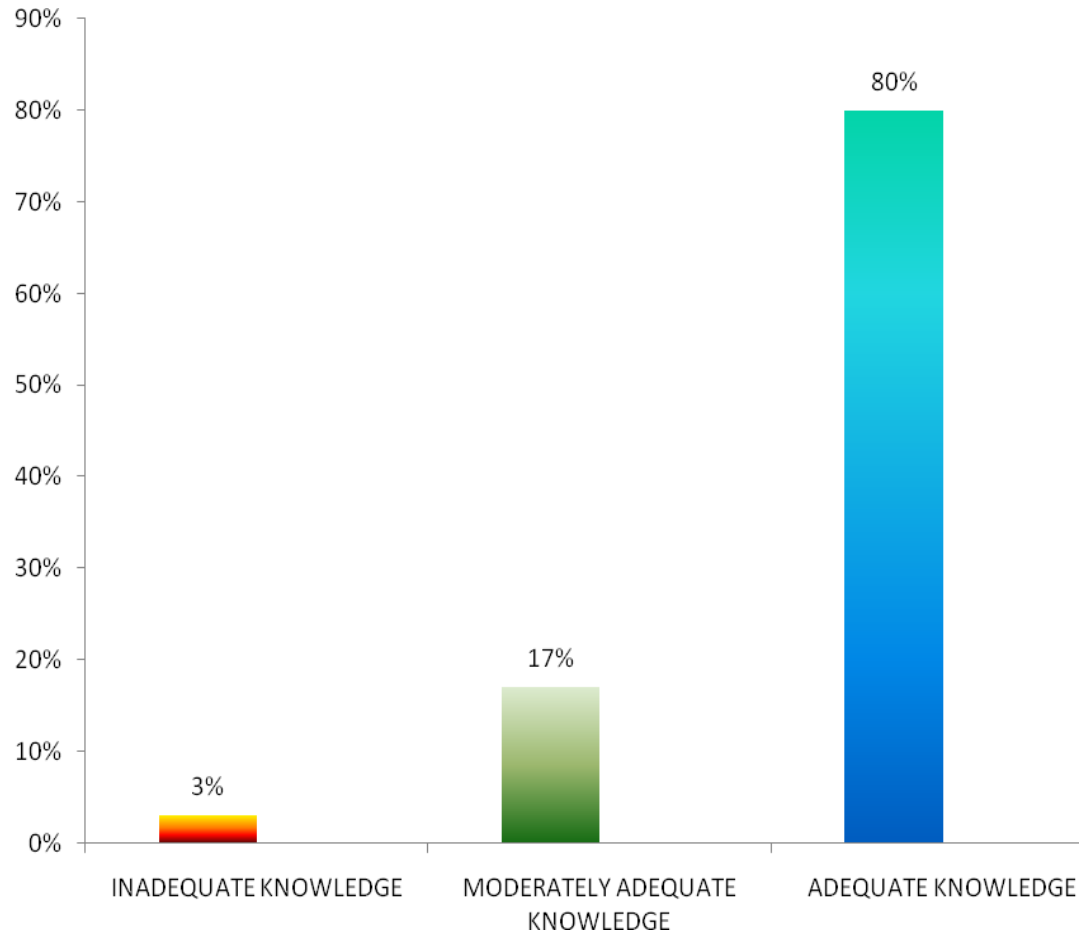
N=30

Scores	Pretest		Post test	
	f	%	f	%
Inadequate knowledge ≤ 50%	27	90	1	3
Moderately adequate knowledge 51-75%	3	10	5	17
Adequate knowledge ≥ 75%	-	-	24	80

Table 2 reveals the frequency and percentage distribution of samples according to their level of knowledge .In the pretest 90% had inadequate knowledge and in the post test 80% had adequate knowledge score .



**Fig. 4. showing that 90% were inadequate knowledge and 10% were moderately knowledgeable in pretest score.**



**Fig. 5. showing that 3% inadequate knowledge scored 17% moderately knowledgeable 80% scored adequate knowledge in the post test score.**



## Section II

This section deals with the effectiveness of structured teaching programme regarding cord blood banking.

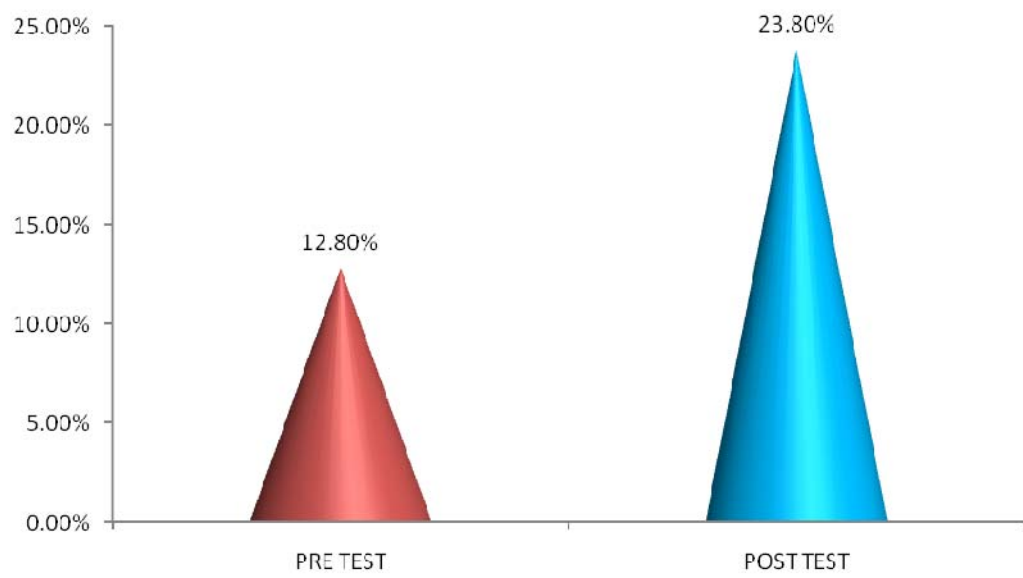
**Table. 3. Mean standard deviation and t values of samples in the group**

N=30

Group	Mean	Standard deviation	't' value
Pretest	12.8	1.64	
			*28.8
Post test	23.8	2.44	

**\*: significant  $P < 0.05$**

Table 3 shows that mean of post test score(23.8) was higher than that of the mean of the pre test score(12.8). The computed 't' value was (28.8) higher than the table value at 0.05 level of significance (2.045) .



**Fig. 6. shows the mean score of pre test and post test**

### Section III

This section deals with the association between pre test knowledge score and selected demographic variables.

**Table .4. Association between pre test knowledge score and selected demographic variables.**

s.no	Demographic variables	$\chi^2$	Df
1.	Age in years	5.228	2
2.	Years of experience	5.228	2
3.	Education	0.396	1
4.	Field of experience	3.481	2

**Significant  $P < 0.05$**

Table 4 showing that there was no association between the pre test knowledge with the demographical variables

## CHAPTER V

### RESULTS AND DISCUSSION

This chapter gives a brief account of the present study including results and discussion .

The present study was undertaken to assess the effectiveness of structured teaching programme on knowledge regarding cord blood banking among staff nurses. The study was conducted in Sree Mookambika medical college hospital , kulaseakaram at kanyakumari district. The pretest was conducted by using structured questionnaire contains 30 knowledge questionnaire . After the structured teaching programme the knowledge level of staff nurses was assessed by using the same structured questionnaire . The results and discussion of the study was based on the findings obtained from the statistical analysis 't' test was used to test the significant difference between the pretest and post test score. Chi Square was used to find out the association between selected demographic variables with level of pre test knowledge on cord blood banking among staff nurses.

**Objectives of the Study:**

1. To assess the level of knowledge of staff nurses before and after structured teaching programme on cord blood banking using structured questionnaire.
2. To determine the effectiveness of structured teaching programme on cord blood banking by comparing the pre and post test knowledge score.
3. To determine association between the pre test knowledge score of staff nurses on cord blood banking with their demographic variables ie age, education ,field of experience and years of experience.

**Distribution of study subjects based on demographic variables:**

The samples were selected based on the inclusion criteria. The characteristics of the samples are discussed below.

Table 1 shows the distribution of subjects according to the demographic variables.

Among 30 staff nurses majority of the staffs (46%) were in the age group of 21-25 years with respect of education 60% were GNM and 40% of were Bsc(n) .

Regarding the years of experience 46% of staffs had 1-5 years of experience

In terms of field of experience 40% had experience in obstetrics and gynecology.

#### **Distribution of the samples according to their level of knowledge:**

Table 2 shows the distribution of samples according to their level of knowledge.

In this study majority of the staff nurses (90%) had the inadequate knowledge level ( $\leq 50\%$ ). The findings showed that increased efforts should be made to understand about cord blood banking.

**The study findings of the 30 samples were discussed based on the objectives of the study.**

**To determine the effectiveness of structured teaching programme on cord blood banking by comparing the pre and post test knowledge score.**

Table 3 shows that the knowledge towards cord blood banking among staff nurses was improved from the pretest to post test as  $12.8 \pm 1.64$  to  $23.8 \pm 2.44$  with the mean improvement of 11.0. The improvement was statistically significant ( $t = 28.8, p < 0.05$ )

This study is congruent with a study conducted by Antonella Brizzolara et al(2010) on knowledge, comprehension, opinions, attitudes and choices related to cord blood donation in seven heterogeneous focus groups including pregnant women, future parents, cord blood donors, midwives and obstetricians/ gynaecologists. Sixty-three questionnaires (100%) returned with almost completely filled. It showed a remarkable lack of knowledge about cord blood donation both by future parent and health professionals .Questionnaire results support the need for more information on cord blood donation and specific education for health professionals. obstetricians/gynaecologists said that health professionals should provide future parents with accurate information about the different possibilities to donate cord blood. The study concluded with a large support to cord blood donation and need for better health professionals education in this field.

**To determine association between the pre test knowledge score of staff nurses on cord blood banking with their demographic variables ie age, education ,field of experience and years of experience**

In this study the investigator found that there was no significant association between the pre test knowledge score of staff nurses on cord blood banking with the demographic variables ie age, education ,field of experience and years of experience.

By summing up all the research findings.

- The research hypothesis(H1) there is a significant improvement in the knowledge level of staff nurses on cord blood banking after structured teaching programme was supported
- The research hypothesis(H2) there is a significant association between the level of knowledge regarding cord blood banking among staff nurses with the selected demographic variables such as age, education ,field of experience and years of experience was not supported .



## CHAPTER VI

### SUMMARY AND RECOMMENDATION

This chapter deals with the summary of the study and conclusion drawn from the study. It also explains the limitation of the study, implication of the study for different areas like nursing education, nursing practice, nursing administration and nursing research.

#### **Summary**

The study was undertaken to assess the knowledge on cord blood banking among staff nurses in Sree mookambika medical college hospital, kulasekaram.

In the present study one group pretest and post test design was used. Conceptual framework used for the study was J.W.Kenny's Open System Model.

#### **Objectives of the Study**

1. To assess the level of knowledge of staff nurses before and after structured teaching programme on cord blood banking using structured questionnaire.
2. To determine the effectiveness of structured teaching programme on cord blood banking by comparing the pre and post test knowledge score.

3. To determine association between the pre test knowledge score of staff nurses on cord blood banking with their demographic variables ie age, education ,field of experience and years of experience.

### **Hypothesis**

**H<sub>1</sub>** : There is a significant improvement in the knowledge level of staff nurses on cord blood banking after structured teaching programme.

**H<sub>2</sub>** : There is a significant association between the level of knowledge regarding cord blood banking among staff nurses with the selected demographic variables such as age, education ,field of experience and years of experience

A quasi experimental one group pretest post test design was found to be suitable for this study. The setting of the study was lecture hall of Sree Mookambika college Hospital, Kulasekaram.

The tool for the study had two parts. The first part of the tool consists of demographic variables. The second part of the tool was structured questionnaire which included questions on knowledge regarding cord blood banking in various aspects. The reliability of the tool was measured by using test- retest method in which the value of 'r' is 0.8 in knowledge questions. The researcher selected the subjects by simple random sampling technique. The population of the study was 30 staff nurses working in Sree mookambika medical college hospital kulasekaram. The period of study was from 1/6/2011 to 30/6/2011.

The collected data were analyzed based on descriptive and inferential statistics according to the above said objectives. The pilot study proved that the tool and design were appropriate

### **The major findings were noted as follows**

The pretest knowledge score was  $12.8 \pm 1.64$  and post test knowledge score was  $23.8 \pm 2.44$ . The structured teaching programme improved the knowledge level on an average of 11.0. The value calculated for the difference of pre test and post test is statistically significant. The 't' value found to be 28.8 at  $p < 0.05$  level of significance. That showed that there was a significant improvement in the knowledge level.

Chi- square test was used to analyze the association between the demographic variable with pre test knowledge score. There is no association between pre test knowledge and demographic variable.

### **Nursing Implication**

The findings of the study reveals the implication on nursing practice- nursing education, nursing research and nursing administration.

#### **Nursing practice**

- Nursing practicing in the health care setting should be equipped with up-to-date knowledge regarding cord blood banking, so that they would be able to impart knowledge to patients

- The nurse educator needs to prepare some charts and posture related to cord blood banking which can be placed in the wards and educational departments.

### **Nursing education**

- Seminar, symposium, role play or workshop regarding cord blood banking can be conducted periodically.
- The topic regarding Cord blood banking can be included in the curriculum with more explanation and information to the nursing students.

### **Nursing research**

- Abstract of the research can be published in the nursing journal .so that further research on related topics is possible.
- The findings of the study help to expand the scientific body of professional knowledge upon which further research can be conducted.
- Further study can be conducted among patients.

### **Nursing administration**

- The nurse administrator should encourage the students and staff members to actively participate in conducting health education programme which is cost effective and convenient .
- Provide funds for conducting seminar, workshop and conferences.

- Encourage the staff to actively participate in inservice education programme.
- Administrators have to integrate this in their continuous education programme for their nursing staffs.
- The findings of study can be utilized as a basis of in-service education programme for nursing students.

### **Recommendation**

- The study can be conducted indifferent setting.
- Similar study can be conducted with control group.
- Similar study can be conducted to compare the knowledge and attitude of mothers towards cord blood banking
- The study can be conducted with large number of samples

### **Limitations**

- Researcher faced certain obstracles from the staff nurses who were on night duty because of change in the normal routines.

## **Conclusion**

Structured teaching programme increases the knowledge. The findings also were congruent with other study. Mean pretest score was  $12.8 \pm 1.64$ ; post test score was  $23.8 \pm 2.44$ . Structured teaching programme was very effective in improving the knowledge of staff nurses regarding cord blood banking. There was no association between selected demographic variables with their level of pre test knowledge score.

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**Electronic version**

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**TEACHING MODULE ON  
UMBILICAL CORD BLOOD  
BANKING**

## TEACHING MODULE

**NAME OF THE RESEARCHER** : V.BABY RAJAKUMARI

**TOPIC** : UMBILICAL CORD BLOOD BANKING

**DURATION** : 1 HOUR

**GROUP** : STAFF NURSES

**VENUE** : SREE MOOKAMBIKA MEDICAL COLLEGE HOSPITAL

**METHOD OF TEACHING** : LECTURE CUM DISCUSSION

**AV AIDS** : BOOKLET AND LCD

## **CENTRAL OBJECTIVES:**


At the end of the structured teaching programme staff nurses are able to gain knowledge regarding Umbilical cord blood banking ,developes positive attitude towards cord blood banking and develope skills in teaching the patient about the importance of umbilical cord blood banking .

## **SPECIFIC OBJECTIVES:**

At the end of the structured teaching programme staff nurses are able to:-

1. state the meaning of umbilical cord blood
2. list down the diseases cured by stem cells
3. describe cord blood transplantation
4. enumerate the types of cord blood transplants
5. narrate advantages and dis advantages Cord Blood Transplantation
6. explain cord Blood Banking


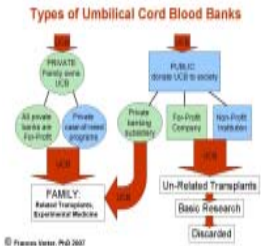
7. enumerate the criteria to be followed in Cord Blood Transplantation
8. discuss the procedure to collect cord blood
9. enlist the particulars while collecting cord blood
10. enumerate the tests carried out in maternal blood and cord blood
11. narrate the technique used for preservation of cord blood
12. explain the efficiency of staff nurses in collection and preservation of cord blood
13. explain the nurses responsibility in collection and preservation of cord blood
14. describe the cost of storage plan
15. list down the public and private cord blood bank in India

SPECIFIC OBJECTIVE	CONTENT	TIME	TEACHING ACTIVITIES AND LEARNING ACTIVITIES	AV AIDS	EVALUATION
Staff nurses are able to state the meaning of	<p><b>INTRODUCTION:</b></p> <p>A baby can be bestowed with love, money, virtually anything, but storing its cord blood is a once in a lifetime opportunity in the real sense. It knocks just once when the baby is born. 42,434 babies are being born per day in India, being the largest source for umbilical cord blood in the bank.</p> <p><b>MEANING OF UMBILICAL CORD BLOOD:</b></p> <p>Cord blood is the blood from the baby that is left in the umbilical cord and placenta after birth. It contains cells called hematopoietic stem cells that</p>	<p>1mt</p> <p>1mt</p>	<p>Teacher explains with the help of lecture method and staffs are listening</p> <p>Teacher explains with the help of Lecture method</p>	<p>Booklet</p> 	<p>What is umbilical cord blood ?</p>



<p>umbilical cord blood</p> <p>Staff nurses are able to list down the diseases cured by stem cells</p>	<p>can be used to treat some diseases.</p> <p><b>DISEASES CURED BY UMBILICAL CORD BLOOD :</b></p> <p>Stem cells occur in places other than cord blood also. They are found in blood, bone marrow, peripheral blood and embryonic cells. The hematopoietic stem cells from cord blood are immature and less likely to cause rejection when transplanted, when compared to bone marrow and peripheral stem cells.</p> <p>Stem cells help to cure</p> <ul style="list-style-type: none"> <li>➤ Acute Leukemia</li> <li>➤ Chronic Leukemia</li> </ul>	<p>3mt</p>	<p>and staffs are listening</p> <p>Teacher explains with the help of Lecture method and staffs are listening</p>	<p>LCD</p>	<p>What are diseases cured by stem cells?</p> <p>What is acute leukemia?</p>
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<p>Staff nurses are</p>	<ul style="list-style-type: none"> <li>➤ Myelodysplastic syndrome</li> <li>➤ Stem cell disorders</li> <li>➤ Myeloproliferate syndrome</li> <li>➤ Lympho proliferation disorder</li> <li>➤ Phagocyte disorder</li> <li>➤ Inherited disorder</li> <li>➤ Inherited metabolic disorder</li> <li>➤ Histiocytic disorder</li> <li>➤ Inherited Erythrocyte abnormalities</li> <li>➤ Plasma cell disorders</li> <li>➤ Inherited Immune system disorders</li> <li>➤ Malignancies</li> </ul> <p><b>CORD BLOOD TRANSPLANTATION:</b></p> <p>The first successful cord blood transplant</p>			<p>LCD</p>	
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<p>able to describe cord blood transplantation</p>	<p>was done in 1989 in a child with fanconi anemia.</p> <p>Approximately 14,000 unrelated cord blood transplants have been performed for patients with hematologic malignancies and bone marrow disorders, and 900,000 cord blood units have been stored privately for personal use, with about 100 autologous transplants performed.</p> <p><b>TYPES:</b></p> <p>Three types of cord blood transplants emerged from these pre clinical studies.</p> <ul style="list-style-type: none"> <li>➤ Autologous cord blood transplants from cord blood stored at birth and used for one's own use</li> </ul>	<p>3mt</p>	<p>Teacher explains with the help of Lecture method and staffs are listening</p>	<p>Booklet</p> 	<p>What is cord blood transplantation?</p>
<p>Staff nurses are able to enumerate the types of cord blood</p>	<p>Three types of cord blood transplants emerged from these pre clinical studies.</p> <ul style="list-style-type: none"> <li>➤ Autologous cord blood transplants from cord blood stored at birth and used for one's own use</li> </ul>	<p>4mt</p>	<p>Teacher explains with the help of Lecture method and staffs are listening</p>	<p>LCD</p> 	<p>What are types of cord blood transplants?</p>

<p>transplants</p>	<ul style="list-style-type: none"> <li>➤ Related cord blood transplants employing stored cord blood from a family member</li> <li>➤ Unrelated transplants using cord blood donated into a bank and available for use worldwide</li> </ul> <p><b>Autologous cord blood transplants :</b></p> <p>Autologous cord blood transplants from cord blood stored at birth and used for one's own use</p> <p><b>Related Cord Blood Transplants:</b></p> <p>Due to the low cell doses obtained from cord blood collection, the first cord blood transplants were performed in children. Related umbilical cord blood transplants have been used for children with</p>				<p>What is related cord blood transplants?</p>
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	<p>malignant and non-malignant diseases.</p> <p><b>Unrelated Cord Blood Transplants:</b></p> <p>Banks worldwide facilitated the initial experience with unrelated cord blood transplantation in children.</p> <p>Based on the encouraging results in children, a number of attempts regarding unrelated cord blood transplantation in adults was performed. The cord blood transplants in adults include the use of single unit cord blood with co-infusion of haploidentical mobilized stem cells on bone marrow from a third party donor.</p> <p>The initial success of the first cord blood</p>				
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<p>Staff nurses are able to narrate the advantages and disadvantages of Cord Blood Transplantation</p>	<p>transplants contributed to the creation of cord blood banks to collect, process and store donated cord blood units.</p> <p><b>COMPARISON OF CORD BLOOD TRANSPLANTATION WITH BONE MARROW:</b></p> <p><b>ADVANTAGES:</b></p> <p>Umbilical cord blood transplantation (UCBT) was extended the availability of allogenic hematopoietic stem cell transplantation (HSCT) to patients who would otherwise not be eligible for this curative approach.</p> <p>1. Significantly faster availability of banked cryopreserved UCB units , with patients receiving UCB transplantation in a median of</p>	<p>5mt</p>	<p>Teacher explains the advantages with help of Lecture method and the staffs are actively listening</p>	<p>LCD</p>	<p>What are the advantages of Cord Blood Transplantation?</p>
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<p>n with Bone marrow</p>	<p>25-36 days earlier than those receiving bone marrow</p> <ol style="list-style-type: none"> <li>2. Lower incidence and severity of acute graft-versus host disease(GVHD)</li> <li>3. Lower risk of transmitting infections by latent viruses, such as cytomegalovirus(CMV).</li> <li>4. Lack of donor attrition.</li> <li>5. Lack of risk to the donor and higher frequency of rare haplotypes compared to bone marrow registries.</li> <li>6. Bone marrow harvesting is an invasive and painful procedure while cord blood extraction is quick ,painless and harmless to both mother and baby.</li> </ol>				
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<p>Staff nurses are able to explain cord Blood Banking</p>	<p>7. Cord blood stems are younger, they are able to degenerate more and faster than bone marrow stem cells.</p> <p><b>DISADVANTAGES:</b></p> <ol style="list-style-type: none"> <li>1. The low number of hematopoietic progenitor cells and HSCs in UCB compared with bone marrow.</li> <li>2. The impossibility of using donor lymphocyte transfusion for immunotherapy.</li> </ol> <p><b>CORD BLOOD BANKING:</b></p> <p>Cord blood banking is a revolutionary method that preserves stem cells from the umbilical cord, so banking cord blood cells at birth is like storing medication for use in future if and when</p>	<p>3mt</p>	<p>Teacher explains the disadvantages with help of Lecture method and the staffs are actively listening</p>	<p>LCD</p>	<p>What are the disadvantages of cord blood transplantation?</p> <p>What is cord</p>
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	<p>needed. It is like securing the baby with biological insurance.</p> <p>The cord blood is stored in two types of Banks.</p> <ul style="list-style-type: none"> <li>➤ Public Bank</li> <li>➤ Private Bank</li> </ul> <p>Public cord bank operate like blood banks. Cord blood is collected for later use by anyone who needs it. The stem cells in the donated blood can be used by any person who matches. Public banks do not charge to collect cord blood.</p> <p>Private banks store cord blood for directed donation. The blood is held for use in treating your baby or relatives. Private banks most often charge a</p>	1mt	<p>Teacher explains the with help of Lecture method and the staffs are actively listening</p>	Booklet	blood banking?
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<p>Staff nurses are able to enumerate the criteria to follow in cord Blood Banking</p>	<p>yearly fee for storage. There will be also a fee for collecting the cord blood.</p> <p><b>CRITERIA TO BE FOLLOWED:</b></p> <ul style="list-style-type: none"> <li>➤ The bank must be notified far in advance (usually 6 weeks or before)</li> <li>➤ A family medical history must be provided.</li> <li>➤ A consent form must be signed before labour begins.</li> <li>➤ Collection materials must be obtained.</li> </ul>	<p>4mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>booklet</p>	<p>What are the criteria to be followed?</p>
<p>Staff nurses are able to discuss the</p>	<p><b>PROCEDURE:</b></p> <p><b>THE COLLECTION PROCESS:</b></p> <p>The cord blood collection happens after the umbilical cord has been cut and is extracted from</p>		<p>Teacher explains with help of Lecture method and the</p>	<p>LCD</p>	<p>What is the procedure of collection of cord blood?</p>

<p>procedure of collect cord blood</p>	<p>the fetal end of the cord, diverting upto 75±23 ml from the neonate. It is usually done within 10 minutes of giving birth. An adequate cord blood requires at least 75 ml in order to ensure that there will be enough cells to be used for a transplantation. The commonly used methods are letting the blood drip out by gravity-versus pulling it out with a syringe. Both collection methods are adequate, but the syringe method yields a higher volume on average. Both collection methods can be used with bag storage, whereas vial storage requires syringe collection. The vial and Bag storage methods both have a long history of use and have yielded successful transplants.</p>		<p>staffs are listening</p>		
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<p>Staff nurses are able to enlist particulars while collecting cord blood</p>	<p>The specimen needs to arrive at the lab within 36-48 hours of its collection. It should not be refrigerated.</p> <p>A 100 ml unit of UCB contain one-tenth the number of nucleated cells and CD 34 + cells present in 1000 ml of bone marrow. Because they multiply rapidly, the stem cells in a single unit of UCB can rebuild the entire hematopoietic system.</p> <p><b>PARTICULARS TO BE KNOWN:</b></p> <ol style="list-style-type: none"> <li>1. Mother's Name</li> <li>2. Home Telephone Number</li> <li>3. Client identity card</li> <li>4. The Baby's Date and Time of Birth</li> </ol>	<p>1mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>		<p>What are particulars to be known ?</p>
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<p>Staff nurses are able to enumerate the tests carried out in maternal and cord blood</p>	<p><b>TESTS TO BE CARRIED OUT:</b></p> <p>Maternal blood is tested for</p> <ul style="list-style-type: none"> <li>➤ Syphilis</li> <li>➤ Hepatitis B &amp; C</li> <li>➤ Malaria</li> <li>➤ Leptospirosis</li> <li>➤ HIV Antigen and Antibody</li> <li>➤ Cytomegalo virus</li> </ul> <p>The collected cord blood is tested for</p> <ol style="list-style-type: none"> <li>a) Rh grouping/typing</li> <li>b) Blood Cultures</li> <li>c) CD 34 counts</li> </ol> <p>These tests are carried out in the labs after the arrival of the samples from the hospital. The mother's concern must be taken</p>	<p>3mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p> 	<p>What are the tests carried out in maternal blood ?</p>
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<p>Staff nurses are able to narrate the technique used for preservation of cord blood</p>	<p><b>TECHNIQUE USED:</b></p> <p>Density gradient separation process is used. This technique depletes the red blood cells and plasma, isolating the mononuclear white blood cell fraction, which contains the stem cells.</p> <p><b>PRESERVATION:</b></p> <p>After the collection, the cord blood unit is shipped or transported by person or medical courier to the lab and processed and then cryopreserved. While transporting the cord blood, it must be maintained in normal room temperature. The stem cells are treated with</p>	<p>5mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p>	<p>what is the technique used for preservation in cord blood banking?</p>
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DMSO(Di Methyl Sulfoxide) the cryoprotectant and stored in cryovials auto logons plasma and sterile media. Some processing methods separate out red blood cells and remove them, while others keep the red blood cells. However the unit is processed, a cryopreservant is added to the cord blood to allow the cells to survive the cryogenic process. After the unit is slowly cooled to -90 Celsius, it can then be added to a liquid nitrogen tank which will keep the cord blood unit frozen at -196 Celsius. The slow freezing process is important to keep the cells alive during the freezing process .If the storage period exceeds one year ,cells should be stored at a


LCD



	<p>temperature of less than -130 degree Celsius .</p> <p>The Liquid nitrogen maintains its temperature at-196 degree Celsius with out any additional system to maintain it at that temperature .As long as there is Liquid Nitrogen in the tank ,the temperature will not increase .Tanks are constructed with a vacuum between the outer and inner walls and significant layers of layers of insulation constructed to radiate away from the storage tank . The electricity is used only for monitoring the function.</p> <p><b>NORMS IN PRESERVATION OF UCB:</b></p> <p>Until the child is of legal age, the parents as the child's guardian have control over the stem cells.</p>				
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<p>Staff nurses are able to explain the efficiency of staff nurses in collection and preservation of UCB</p>	<p>Stem cell will not be released by the lab without the parent's consent or child's consent once they reach legal age.</p> <p><b>EFFICENCY OF STAFF NURSE IN UCB:</b></p> <p>The Cord Blood Collection should be performed by staff with documented appropriate training ,experience ,and proficiency in the technique utilized .The Health professional should be experienced in venipuncture ,infection control ,handling of biohazardous material.The nurses can gain additional knowledge from person, mass media(video),written material.</p>	<p>2mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p>	<p>what are the efficiency of a staff nurse must hold in cord blood collection and preservation?</p>
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<p>Staff nurses are able to explain the nurses responsibility in collection and preservation of UCB</p>	<p><b>NURSES RESPONSIBILITY:</b></p> <p>Expectant parents have many decisions to consider regarding the delivery and care of their newborn . Nurses has the responsibility to explain the advantages of umbilical cord blood banking.Nurses must explain the following to the patients</p> <p>1.Cord blood stem cells can be used as cures and therapies for patients facing deadly blood cancers and other life-threatening illnesses.</p> <p>2. Cord blood stem cells offer an inexhaustible, easily obtainable and less costly source compared</p>	<p>3mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p> 	<p>What are the responsibility of a nurse in cord blood collection?</p>
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	<p>to those obtained from adult bone marrow donors.</p> <p>3. Umbilical cord blood collection poses no risks to the mother or baby as the blood is collected following delivery.</p> <p>4. Collection of these cells does not have the ethical or political concerns that surround the use of human embryonic stem cells because the harvesting of cord blood-derived stem cells does not harm the full-term infant donor. Researchers are working to discover future treatments for cardiovascular disease, diabetes, and neurological disorders including Alzheimer's disease and Sickle Cell.</p> <p>Expectant parents have basically three</p>				
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	<p>choices in deciding what to do with the baby's umbilical cord blood. You may pay to have it privately banked for your own families use, you may donate it at no cost to a public bank or you may choose to have it discarded. The private banking option should be considered in families where there is a history of certain types of genetic anemias, cancers or autoimmune disorders. Privately banking umbilical cord blood guarantees the umbilical cord blood will be available to you if you or your family should ever unfortunately need the cells.</p> <p>Through voluntary, public cord blood programs, you can donate your baby's normally discarded umbilical cord blood, which contains cord</p>				
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<p>Staff nurses are able to describe the cost of storage</p>	<p>blood-derived stem cells. You can help save a life through the donation of your baby's umbilical cord blood. Upon donation, your baby's cord blood type will be entered into a national database registry that can be searched by doctors in need of a match for one of their patients.</p> <p><b>COST OF STORAGE PLAN:</b></p> <p><b>STANDARD STROAGE PLAN:</b></p> <p>Enrolment Fee-Rs. 5000/-</p> <p>Testing, Processing, Harvesting &amp; Courier Fee(One Time)- Rs. 32,600/-</p> <p>Annual Storage Fee-Rs. 3,500/-</p> <p>Total amount to be paid at the time of enrollment-Rs. 41,100/-</p>	<p>5mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p>	<p>What are the three choices of parents in deciding about cord blood bank?</p>
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<p>plan</p> <p>Staff nurses are able to list down the public and private cord blood bank in</p>	<p><b>ONE TIME STORAGE PLAN:</b></p> <p>(Includes Enrollment, Processing and Storage Fees for 21 years)-Rs. 75,000/-</p> <p><i>(Info. Up-to-dated as on 1<sup>st</sup> May 2007</i></p> <p><b>LIST OF CORD BLOOD BANK IN INDIA:</b></p> <p><b>a) PUBLIC CORD BLOOD BANK:</b></p> <p><b>Jeevan Blood Bank:</b> was the first not-for profit stem cell bank in the country. They charge a one time fee Of Rs.70,000 from private parties, free of cost to poor patients and charges Rs.1 lakh for other patients</p> <p><b>b) PRIVATE CORD BLOOD BANKS:</b></p> <p><b>1) Baby Cell India:</b></p> <p>INTERNET :baby cell .in</p>	<p>8mt</p>	<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p>	<p>What is the cost of storage plan?</p>
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<p>India</p>	<p>PHONE:1-800-209-0309  OFFICE:Pune,Mumbai  STORAGE : Pune, Maharashtra.</p> <p><b>2) Cord Life Sciences (India) Private Limited:</b>  INTERNET :www. cordlifeindia.com  PHONE:91-33-2489565  OFFICE:Kolkata.West Bengal.  STORAGE :Kolkata.WestBengal ,India</p> <p><b>3) Cryobanks international India:</b>  INTERNET: www.cryobanksindia .com  PHONE:1-800-180-1217or1-800-102- 279  OFFICE&amp; STORAGE: Gurgaon (Haryana)</p> <p><b>4) Cryo Save (India) Pvt. Ltd:</b>  INTERNET:www.cryo-save.com  PHONE:+91 80 42430100 or 1800  1030100</p>		<p>Teacher explains with help of Lecture method and the staffs are listening</p>	<p>LCD</p> 	<p>What are the public and private cord blood banks in India?</p>
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	<p>OFFICE:Bangalore,India</p> <p>STORAGE : Bangalore,India.</p> <p><b>5) International Stem Cell Services Ltd :</b></p> <p>INTERNET:www.internationalstemcellservices.com</p> <p>PHONE :+91 80 65652220 or +91 9916964460</p> <p>OFFICE: Bangalore ,India</p> <p>STORAGE : Bangalore ,India.</p> <p><b>6) Life Cell India:</b></p> <p>INTERNET :www.lifecellinternational.com</p> <p>PHONE :+91 800-425-5323</p> <p>OFFICE: Chennai. (Keelakottiyur)</p>				<p>Which is the nearest bank to kanya kumari?</p>
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	<p>STORAGE : Chennai.(Keelakottiyur.</p> <p><b>7) Nanog India Pvt Ltd:</b></p> <p>INTERNET :www .nanogindia.com</p> <p>PHONE :020 32240 6366</p> <p>OFFICE: Pune (Maharashtra).India</p> <p>STORAGE : Pune</p> <p>(Maharashtra).India.</p> <p><b>8) Reliance Life Sciences Pvt Ltd:</b></p> <p>INTERNET:www.relbo.com</p> <p>OFFICE: Sir .H.N. Hospital&amp; Research</p> <p>Centre . Mumbai ,India.</p> <p><b>8) Stem one Biologicals Pvt Ltd:</b></p> <p>INTERNET :www.stemone.co.in; Email:</p> <p>info@stemone .co.in</p>				
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	<p>PHONE :+91 20 2545 1509</p> <p>OFFICE: Pune (Maharashtra).India.</p> <p>STORAGE : Pune (Maharashtra).India.</p> <p><b>9) Credence Hospital:</b></p> <p>INTERNET :www .credence hospital.com</p> <p>PHONE :04712554343</p> <p>OFFICE: Ulloor ,Trivandrum ,India.</p> <p>STORAGE : Ulloor ,Trivandrum ,India.</p> <p><b>10)Life Cell International :</b></p> <p>INTERNET :www .lifecellinternational.com</p> <p>OFFICE: Salem&amp;Tirunelveli ,India.</p> <p>STORAGE : Salem, Tirunelveli (Opened Recently in 2010)</p>				<p>Which place cryo save situated?</p>
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**12)Jeevan Blood Bank:**

INTERNET :www .jeevan.com

OFFICE: Chennai ,India.

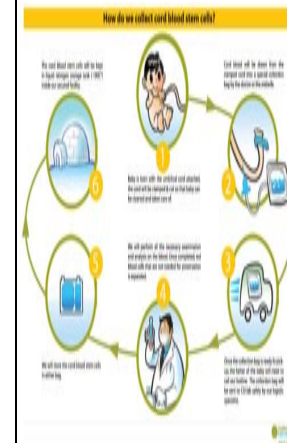
STORAGE : Chennai ,India.

**CONCLUSION:**

Cord blood banking is a revolutionary, method, which helps to cure more than 80 diseases If the staff nurses has adequate knowledge ,they can teach the people about cord blood banking ,its collection and preservation.

**SUMMARY:**

Till now we have discussed about cord blood ,stem cells and cord blood banking.



Which bank has the facility of both public and private

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