

**EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON  
KNOWLEDGE REGARDING PLACENTAL STEM CELLS  
UTILIZATION AMONG STAFF NURSES AT SELECTED HOSPITALS  
IN MADURAI, TAMILNADU**



**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R.  
MEDICAL UNIVERSTITY, CHENNAI, IN PARTIAL FULFILLMENT  
OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF  
SCIENCE IN NURSING**

**APRIL – 2012**

**EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON  
KNOWLEDGE REGARDING PLACENTAL STEM CELLS  
UTILIZATION AMONG STAFF NURSES AT SELECTED HOSPITALS  
IN MADURAI, TAMILNADU**

**30105423**



**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R.  
MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT  
OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF  
SCIENCE IN NURSING**

**APRIL - 2012**

**EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON  
KNOWLEDGE REGARDING PLACENTAL STEM CELLS  
UTILIZATION AMONG STAFF NURSES AT SELECTED HOSPITALS  
IN MADURAI, TAMILNADU**

**BY**

**Mrs.SUDHA K.N**



**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R.  
MEDICAL UNIVERSTITY, CHENNAI, IN PARTIAL FULFILLMENT  
OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF  
SCIENCE IN NURSING**

**APRIL - 2012**



# **MATHA COLLEGE OF NURSING**

**(Affiliated to the Tamilnadu Dr. M.G.R. Medical University),**

**VAANPURAM, MANAMADURAI – 630 606,  
SIVAGANGAI DISTRICT, TAMILNADU**

## **CERTIFICATE**

This is the bonafide work of **Mrs. SUDHA K.N., M. Sc., Nursing (2010-2012 Batch)** II Year Student from Matha College of Nursing, (Matha Memorial Education Trust) Manamadurai – 630606, submitted in partial fulfilment for the **Degree of Master of Science in Nursing**, under the Tamilnadu Dr. M.G.R. Medical University, Chennai.

**SIGNATURE : .....**

**Prof. Mrs. M.SHABERA BANU, M. sc., (N), (Ph. D)**

Principal cum HOD, Dept of OBG,

Matha College of Nursing,

Manamadurai.

**COLLEGE SEAL:**

**APRIL -2012**

**EFFECTIVENESS OF SELF INSTRUCTIONAL MODULE ON  
KNOWLEDGE REGARDING PLACENTAL STEM CELLS  
UTILIZATION AMONG STAFF NURSES AT SELECTED  
HOSPITALS IN MADURAI, TAMILNADU**

*Approved by the Dissertation Committee on \_\_\_\_\_*

*Professor in Nursing Research*

*And Guide* : \_\_\_\_\_

**Prof. Mrs. M.SHABERA BANU, M.Sc., (N), (Ph.D)**

Principal cum HOD, Dept of OBG,

Matha College of Nursing, Manamadurai.

*Research Co-Guide:* \_\_\_\_\_

**Mrs. ARULMOZHI M .sc. (N),**

Lecturer, Dept of OBG,

Matha College of Nursing, Manamadurai.

**Medical Expert** : \_\_\_\_\_

**Dr. (Mrs).T.LAKSHMI DEVI, MD, DGO**

**Assistant surgeon, obstetrician and gynaecologist,**

**Government hospitals, sivagangai.**

**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R.  
MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF  
THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE  
IN NURSING  
APRIL -2012**

## **ACKNOWLEDGEMENT**

I wish to cherish my heartfelt gratitude to GOD ALMIGHTY for his abundant grace, love, wisdom, knowledge, strength and blessing in making this study successful and fruitful.

I wish to express my sincere thanks to Mr. **JEYAKUMAR, MA., BL.,** founder chairman and Mrs. **JEYAPACKIAM JEYAKUMAR, MA.,** Bursar of **MATHA MEMORIAL EDUCATION TRUST, MANAMADURAI** for their unstinted support, encouragement and providing the required facilities for the successful completion of this study.

I am extremely grateful to Professor **Mrs. JEBAMANI AUGUSTINE M.Sc.(N) ,R.N.R.M,** DEAN, Head of the department of Medical Surgical Nursing, Matha college of Nursing, Manamadurai, for her erudition elegant pointed direction and valuable suggestion in completing this study.

It is my pleasure and privilege to express my sincere thanks to my guide Professor. **Mrs. SHABERA BANU, M.SC.,(N) (Ph. D)** principal and Head of the Department of Obstetrics and Gynaecological Nursing, Matha College of Nursing for her valuable guidance and support throughout this study.

I extend my special thanks to **Dr. (Mrs) .T.LAKSHMI DEVI, MD, DGO., Government Hospital, Sivagangai** for her valuable suggestions.

I extend my special thanks to Professor **Mrs. KALAI GURU SELVI M.Sc. (N)**, Vice principal, Head of the Department of Paediatric Nursing, Matha college of Nursing, Manamadurai, for her valuable suggestions and advice given throughout this study.

I offer my earnest gratitude to Professor. **Mrs. THAMARAI SELVI, M.SC.(N),(Ph.D)** Administrative vice principal Department of Obstetrics and gynaecological Nursing, Matha college of Nursing, for her constant guidance ,great concern, immense help and support without which the study would never have taken this commendable shape and form.

I wish to acknowledge my thanks to my co-guide **Mrs. ARULMOZHI M. Sc. (N) R.N.R.M** Lecturer, Department of OBG Nursing, Matha College of Nursing, Manamadurai. I express my deep sense of gratitude for her expert guidance, valuable suggestions, encouragement and keep interest in the conception, planning and execution of the study.

I wish to acknowledge my thanks to **Ms. AMALA NAMBIKKAI M.Sc (N)** Lecturer, Matha college of Nursing, Manamadurai for their support and guidance.

I acknowledge my thanks to **All faculty members** of Matha college of Nursing, Manamadurai for their support and guidance.

I am thankful to the **LIBRARIANS** of Matha college of Nursing, Manamadurai for their help with literature work and for extending library facilities throughout the study.

I owe my sincere thanks profoundly to **Dr. Mr.DUR AISAMY**, PhD. Professor of Biostatistics, for his immense help and guidance in statistical analysis.

My special thanks to the Chief doctor of **APOLLO SPECIALITY HOSPITALS, MADURAI** for granting permission to conduct the study in the Hospital.

My thanks are due to the **participants** of the study for extending their co-operation, without which it would not have been possible to conduct the study within stipulated time.

I record my thanks to Mr. Ravichandran M.Sc., B.Ed ,Mphil, for his help in editing the manuscript.

My special words of thanks to **Mrs. ARZTA SOPHIA**, M.Sc.Nursing, Reader, Department of OBG Nursing, Neyyoor. Who provide untimely constant



support, guidance and encouragement throughout the course of study and without which I would not have been able to finish the study on time.

My expression of heartfelt gratitude and thanks in ample measures to my beloved husband **Mr. Saravanan N.**, for his constant support throughout the study.

This would not have been possible without the constant support from family members. So I acknowledge and dedicate this dissertation to my family members. I am very much graceful to my Mother in law **Mrs. Rajeswari N.** and my beloved parents **Mr. Nagaian. K** and **Mrs. Andichiammal** for their constant encouragement and valuable support.

I wish to extend my sincere thanks to my brothers **Mr.Srinath K.N.** and **Arun K.N.** and my sisters **Saritha K.N., Sangeetha K.N., and Nathiya K.N.** for their encouragement and support.

Very special thanks to my beloved **classmates and friends** for their timely help and co-operation during the study and all my well-wishers and many others who have helped me directly and indirectly in the preparation of this thesis.

## TABLE OF CONTENTS

<b>CHAPTERS</b>	<b>CONTENT</b>	<b>PAGE NO</b>
<b>Chapter I</b>	<b>INTRODUCTION</b>	1-3
	Need for the study	3-7
	Statement of the problem	7
	Objectives of the study	7
	Hypotheses	8
	Operational definitions	3-9
	Assumptions	9-10
	Limitations	10
	Projected outcome	10
	Conceptual frame work	11-13
<b>Chapter II</b>	<b>REVIEW OF LITERATURE</b>	14-30
<b>Chapter III</b>	<b>RESEARCH METHODOLOGY</b>	31-37
	Research approach	31
	Research design	31
	Variables	32
	Setting of the study	32
	Population	33
	Sample size and sampling technique	33
	Criteria for sample selection	33
	Description of the tool	34
	Scoring procedure	35
	Validity and Reliability	35-36

<b>CHAPTERS</b>	<b>CONTENT</b>	<b>PAGE NO</b>
	Pilot study	36
	Procedure for data collection	36
	Plan for data analysis	37
	Protection of human rights	37
<b>Chapter IV</b>	<b>DATA ANALYSIS AND INTERPRETATION</b>	38-60
<b>Chapter V</b>	<b>DISCUSSION</b>	61-67
<b>Chapter VI</b>	<b>SUMMARY AND RECOMMENDATIONS</b>	68-71
	Major findings of the study	72-73
	Implications for nursing practice	74
	Implications for nursing education	74
	Implications for nursing administration	75
	Implications for nursing research	75
	Recommendations for future research	76
	Conclusion	77
	<b>REFERENCES</b>	78-84

## LIST OF TABLES

<b>TABLE NO.</b>	<b>TITLE</b>	<b>PAGE NO.</b>
1	Distribution of samples based on the selected demographic variables	40
2	Distribution of pre-test knowledge score regarding placental stem cells utilization	52
3	Distribution of post-test knowledge score regarding placental stem cells utilization	53
4	Effectiveness of mean pre-test and post-test knowledge scores of the samples	55
5	Association between Post-test knowledge Scores and demographic variables	57

## LIST OF FIGURES

S.NO	TITLE	PAGE NO
1	Conceptual frame work based on J.W.Kenny's open system model (1969)	13
2	Distribution of samples According to Age	45
3	Distribution of samples According to Sex	45
4	Distribution of samples According to religion	46
5	Distribution of samples According to Marital status	46
6	Distribution of samples According to type of family	47
7	Distribution of samples According to Area of residence	47
8	Distribution of samples According to Professional qualification	48
9	Distribution of samples According to Institution studied	48

<b>S.NO</b>	<b>TITLE</b>	<b>PAGE NO</b>
10	Distribution of samples According to previous work experience	49
11	Distribution of samples According to years of experience	49
12	Distribution of samples According to Availability of educational programme	50
13	Distribution of samples According to sources of knowledge about placental stem cells utilization	51
14	Distribution of pre-test knowledge score regarding placental stem cells utilization	54
15	Distribution of post-test knowledge score regarding placental stem cells utilization	54

## LIST OF APPENDICES

APPENDIX NO	LIST OF APPENDIX
I.	Letter seeking experts opinion for content validity of tool
II.	List Of Experts Opinion For The Content Validity Of Research Tool
III.	Letter Seeking Permission To Conduct Study
IV.	➤ Demographic variables ➤ Knowledge questionnaire (English)
V.	Answer Key
VI.	Self- Instructional Module

## **ABSTRACT**

Stem cells are the basic building blocks of the body and have the potential to replenish other cells and give rise to number of tissues which constitute different organs. Major sources of stem cells are bone marrow, peripheral blood, placental cord blood or cord blood, and embryo. The placental cord blood is one of the richest and non- controversial sources of stem cells. They are the building blocks of the blood, immune system and precursors of various cells and tissues.

Today, placental cord blood stem cells are a major breakthrough in regenerative medical research, in the field of medicine worldwide. On an average more than 260 patients receive placental stem cells transplant each month and more than 25,000 transplantation have been done from the year 1998 throughout the world.

## **STATEMENT OF THE PROBLEM**

A study to assess the effectiveness of self-instructional module on knowledge regarding placental stem cells utilization among staff nurses in selected hospitals at Madurai.



## **METHODOLOGY**

Quantitative research approach was used in this study. The research design adopted for this study was pre- experimental one group pre- test post-test design. The study was conducted in Apollo Speciality hospitals, Madurai. Convenient sampling technique was used for sample selection. The sample size was 100 staff nurses who fulfilled the inclusion criteria.

## **OBJECTIVES**

1. To assess the pre-test level of knowledge regarding placental stem cells utilization.
2. To assess the post-test level of knowledge regarding placental stem cells utilization.
3. To evaluate the effectiveness of self Instructional module on placental stem cells utilization.
4. To find out the association between the post -test level of knowledge with selected demographic variables among nurses such as age, sex, religion, marital status, type of family, area of residence, professional qualification, institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

## **HYPOTHESES**

1. The mean post-test knowledge score of nurses who had self-Instructional module regarding placental stem cells utilization will be significantly higher than mean pre-test knowledge score.
2. There will be a significant association between post-test knowledge regarding placental stem cells utilization and the selected demographic variables of nurses.

## **MAJOR FINDINGS OF THE STUDY**

- ❖ Majority of the samples were in the age group of 22-25 years 62(62%)
- ❖ Majority of the samples were females 90 (90%)
- ❖ Majority of the samples were Christians 52 (52%)
- ❖ Majority of the samples were un-married 63 (63%)
- ❖ Majority of the samples belongs to nuclear family 76 (76%)
- ❖ Majority of the samples belongs to living in Urban 56(56%)
- ❖ Majority of the samples were belongs to GNM 38 (38%)
- ❖ Majority of the samples had completed in Govt. School of nursing 39 (39%)
- ❖ Majority of the samples had previous work experience in neonatal ward was 37 (37%)

- ❖ Majority of the samples belongs to 1-5 years of experience 72 (72%)
- ❖ Majority of the samples had availability of educational programme 35 (35%) In- service education
- ❖ Majority of the samples had the source of knowledge regarding placental stem cells utilization got information from stem cell banks- Newsletters 43 (43%)
- ❖ The pre-test score reveals that 54 (54%) nurses had inadequate knowledge, 45 (45%) had moderately adequate knowledge, 1 (1%) had adequate knowledge regarding placental stem cells utilization.
- ❖ The post-test score 33 (33%) nurses had adequate knowledge, 67(67%) had moderately adequate knowledge, and none of them had inadequate knowledge regarding placental stem cells utilization
- ❖ The mean posttest knowledge score of the subjects 28.00 is higher than the mean pretest knowledge score 16.00. The calculated 't' value 35.178 is greater than of table value (1.984) at 0.05 level of significance. Which indicates that Self Instructional Module is effective in gaining in subjects knowledge regarding placental stem cells utilization.
- ❖ Chi-square was computed to find out the association between mean post- test knowledge score and demographic variables. The

result shows there is a significant association between area of residence, professional qualification, institution studied, previous work experience, Availability of educational programme, source of knowledge about placental stem cells utilization. Other demographic characteristics did not show association with knowledge regarding placental stem cells utilization.

## **RECOMMENDATIONS**

On the basis of present study, following recommendations are made,

- Similar study can be done with large sample.
- A similar study can be conducted to assess the knowledge and attitude among staff nurses.
- A comparative study also can be done to determine the knowledge and practice of placental stem cells utilization among urban and rural hospitals.
- A comparative study can be conducted to assess the knowledge regarding GNM students and B.Sc. Nursing students.
- A similar study can be conducted in the community area among nurses in the primary health centre.

## **CONCLUSION**

Self -Instructional Module on placental stem cells utilization was effective in improved adequate and moderately adequate knowledge. So awareness programme could be organized related to current status in health. Periodically nurses need to be motivated to attend more conferences, workshops, and continuing education programme to get updated.

# CHAPTER I

## INTRODUCTION

**“The Tissue of youth-Human placenta a wonder drug,  
Call it the oxygen bar of future.”**

**-Amanda Schaffer**

Health is the most important aspect of life which needs to be maintained at any time in a person's life at any cost.

Stem cells are the basic building blocks of the body and have the potential to replenish other cells and give rise to number of tissues which constitute different organs. Major sources of stem cells are bone marrow, peripheral blood, cord blood or placenta, and embryo.

Stem cells are unspecialized cells that have two defining properties i.e. the ability to differentiate in to other cells and the ability to self-regenerate. These cells migrate to injured areas with in the body and get transplanted and transform themselves in to new tissue cells that replace the damaged ones. Stem cells have the capacity to multiply and renew themselves almost indefinitely. Stem cells can form nerve cells, muscle cells and blood cells which cannot multiply themselves and have limited life spans. In tissue, that is still developing, stem cells give rise to multiple specialized cells types that can make up the heart, lung, skin, and other tissues.

Hematopoietic stem cells are the building blocks of life. These stem cells are found in the bone marrow and give rise to all the blood cell types and have become an invaluable treatment for a variety of critical diseases.

Cord blood is the blood remaining in a baby's umbilical cord and placenta following birth. It is one of the richest and controversial sources of stem cells. Stem cells are the building blocks of blood, immune system and precursors of various cells and tissues. The collection procedure is very safe and poses no risk or discomfort to mother or baby.

Placental stem cells therapy is a type of adult stem cell therapy that utilizes the placenta or after birth of a woman who has undergone the child birthing process specializing in placenta stem cell therapy and degenerative disease, Dr. Gonzalez is a leader in the field of stem cell treatments for chronic fatigue, insomnia, stress and anxiety, autoimmune disease like multiple sclerosis, lupus and diabetes, kidney disorder, muscular dystrophy, as well as chronic infections and malignant tumours, myocardial infarction.

Placental stem cells harvesting is considered an ethical procedure that takes advantage of multipotent stem cells found in the placental after birth.

Placental cord blood stem cells can be regenerated into any blood cells, including oxygen carrying red blood cells, infection fighting white blood cells, which play a crucial role in the body's immune system (ability to fight disease) and platelets which help to clot blood during cuts and bruises. Placental cord blood stem cells have been used for transplants in patients with life threatening diseases such as leukemia or immune system disorders (Bhattacharya, N, 2001)

### **SIGNIFICANCE AND NEED FOR THE STUDY**

Placenta is an organ within the uterus which connects embryo to the wall of the uterus and provide nourishment, eliminates waste and exchange respiratory gases of the embryo.

Placental umbilical cord is the essential vitalizing direct interlink between a mother and her child, which is always depicted as the relationship and an emotional bonding of motherhood, which is a beautiful experience for a woman. **(Lowdermilk DL. Perry SE, 2007).**

When mother gives birth, the blood that remains in the placenta and umbilical cord is referred as cord blood. This particular blood contains numerous hematopoietic stem cells that have the ability to differentiate into other cells and the ability to self-degenerate. **(Kumaraswamy. S, 2010).**



A new paradigm in medical therapeutics reported the following studies existence of multipotent stem cells in the placental cord blood cell giving rise to cell types other than their tissue of origin. The stem cells infusion and transplantation to treated the different disease such as juvenile diabetes, multiple sclerosis, Parkinson' s disease, acute lymphoblastic leukemia, sickle cell anemia. **(Based on the stem cell research report by Sadanand,2010).**

Stem cells transplantation is a lifesaving procedure for a number of malignant and nonmalignant life threatening diseases. More than 40,000 stem cells transplantations are being performed annually worldwide. India, progress has been slow and the number of transplants performed till now is around 500. **(Stem cell research report, 2010).**

Placenta was considered as medical waste and was discarded. Researchers found that it can be used for preparation of cosmetics and now found that this is a source of precious primitive hematopoietic stem cells and progenitor cells that can reconstitute the hematopoietic system in patients with malignant and non-malignant disorders treated with myelo ablative therapy. **(Lalitha M,2008).**

The chaitanya stem cells center reported that following studies were conducted regarding adult and children stem cells therapy treated

more than 92 cases with the help of stem cells, out of 70% cases have shown clinical improvements to help of stem cells transplantation patients including treated the cerebral palsy, mental retardation, autism over the last 3-6 years and adult stem cells therapy to treated the incurable diseases like stroke, spinal cord injury, and paraplegia, parkinsonism and autism. **(2008).**

A study was estimated that approximately 1.4 million men and women in the U.S population should be diagnosed with cancer and approximately 566,000 American adults should die from cancer in 2008.**(American nurses association reported, 2007).**

In current and future perspective of the stem cells research report, the placental stem cells have many significant advantages over the sources. Umbilical stem cells are freshest and youngest stem cells, more tolerant to tissue mismatch, do not have DNA mutation that adult stem cells may develop overtime, avoids ethical debate and it is a biological health insurance for donor. Placental cord blood stem cells may be useful for the siblings, parents or cousins if there is an adequate HLA match **(2007).**

American nurses association reported that following studies were conducted regarding adult stem cells treatment to help transplants patients

begin clinical trials, spinal cord injuries treated with adult stem cells grafts, adult olfactory mucosa may be source of multipotent stem cells, adult stem cells to treat non healing bone fractures, stem cells used to treat lupus, and umbilical cord blood stem cells transplant saves baby's life **(2006)**.

Placental cord blood is the blood left in the umbilical cord within the placenta after birth of the child and is collected after the cord has been cut off within 10-15 minutes. The umbilical cord is routinely discarded with the placenta after a child is born. Cord blood also called placental blood. Placental cord blood has lots of blood producing stem cells which can be frozen and later used for transplants. It is genetically unique to the child and the family **(Hurley CK, 2006)**.

A study was conducted regarding placenta based cells just as useful as embryonic stem cells. Umbilical cord blood stem cells heal paralytic, placental cells similar to and easier to use than embryonic stem cells and adult stem cells successful in treatment of Parkinson's disease. **(The stem cell research report, 2005)**.

The placental stem cells therapy is effective, nontoxic and risk free for patients of all ages including infants. The nursing personnel are the main source of information, and they can provide the current technologies

regarding placental stem cells utilization. Based on the above fact the researcher felt the importance to conduct the study on knowledge regarding placental stem cells utilization among staff nurses.

### **STATEMENT OF THE PROBLEM**

A study to assess the effectiveness of self-instructional module on knowledge regarding placental stem cells utilization among staff nurses in selected hospitals at Madurai.

### **OBJECTIVES**

1. To assess the pre-test level of knowledge regarding placental stem cells utilization.
2. To assess the post-test level of knowledge regarding placental stem cells utilization.
3. To evaluate the effectiveness of self Instructional module on placental stem cells utilization.
4. To find out the association between the post-test level of knowledge with selected demographic variables among nurses such as age, sex, religion, marital status, type of family, area of residence, professional qualification, institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

## **HYPOTHESES**

1. The mean post-test knowledge score of nurses who had self-Instructional module regarding placental stem cells utilization will be significantly higher than mean pre-test knowledge score.
2. There will be a significant association between post-test knowledge regarding placental stem cells utilization and the selected demographic variables of nurses.

## **OPERATIONAL DEFINITION**

### **Effectiveness:**

Refers to significant gain in knowledge as determined by significant differences between the pre-test and post-test knowledge score of placental stem cells utilization.

### **Self- instructional module (SIM):**

Refers to systematically organized learning module prepared by the investigator and validated by experts on placental stem cells utilization which describes about stem cells, sources, indications, collection, storage, utilization, list of stem cells transplantation centre and services available.

**Knowledge:**

It refers to the information or awareness regarding placental stem cells utilization. This is assessed by their written response to the questionnaire and measured in terms of knowledge score.

**Placental stem cells utilization:**

It refers to the use of stem cells derived from within the placenta like cord blood stem cells to an individual in order to improve the health status or to get recovery from a particular disease such as acute lymphoplastic leukemia, aplastic anaemia, sickle cell anaemia, Parkinson's disease, stroke, spinal cord injury.

**Nurses:**

Staff Nurses refers to those registered nurses who possess a diploma/degree in nursing and provide comprehensive nursing care in clinical area.

**ASSUMPTION**

- Staff nurses may have some knowledge and they are in need to strengthen the knowledge regarding placental stem cells utilization.
- Self- instructional module may build up increase the knowledge regarding placental stem cells utilization.

- Currently, the placental stem cells utilization treated with the diseases such as acute lymphoblastic leukemia, aplastic anemia, sickle cell anemia, Parkinson's disease, stroke, spinal cord injury so it helps to increase the nurses to make awareness regarding placental stem cells utilization.

### **LIMITATIONS**

- This study is limited to the sample size is 100 staff nurses.
- The study will be limited to assess only the knowledge regarding placental stem cells utilization among staff nurses.
- The data collection period is limited to 6 weeks.

### **PROJECTED OUTCOME:**

The findings of the study would help to determine the effectiveness of self- instructional module on knowledge regarding placental stem cells utilization among staff nurses in Apollo Speciality hospitals which will improve their knowledge.

## CONCEPTUAL FRAMEWORK

### J.W.KENNEY'S OPEN SYSTEM MODEL

This study was based on J.W. Kenney's open system model. All living systems are open. In this system, there is a continual exchange of matter, energy and environment.

Open systems have varying degrees of interaction with the environment from which the system receives input and gives back output in the form of matter, energy and information. The main concept of the open system model is input, throughput, output and feedback.

#### **Input:**

In open system theory, Input refers to matter, energy and information that enter in the system through its boundary.

The investigator assesses the demographic variables prior to pre-test knowledge related to placental stem cells utilization. In this study the input indicates that self- instructional module on placental stem cells utilization among staff nurses.

#### **Throughput:**

Through put refers to processing where the system transforms energy, matter and information. In this study, throughput refers to process of gaining knowledge on placental stem cells utilization among staff nurses.



## **Output**

After processing input, the system returns output to the environment in an altered state. Here, the output denotes the post-test which was conducted and the result was categorized in three degrees such as,

- Adequate knowledge
- Moderately adequate knowledge
- Inadequate knowledge

## **Feedback:**

The feedback refers to the environment responses to the system's output used by the system in adjustment, correction and accommodation to the interaction with the environment. In this study, feedback refers to the nurses those who had inadequate and moderate level of knowledge, was given self-instructional module on placental stem cells utilization and the output was evaluated again. This is not carried out in this study.

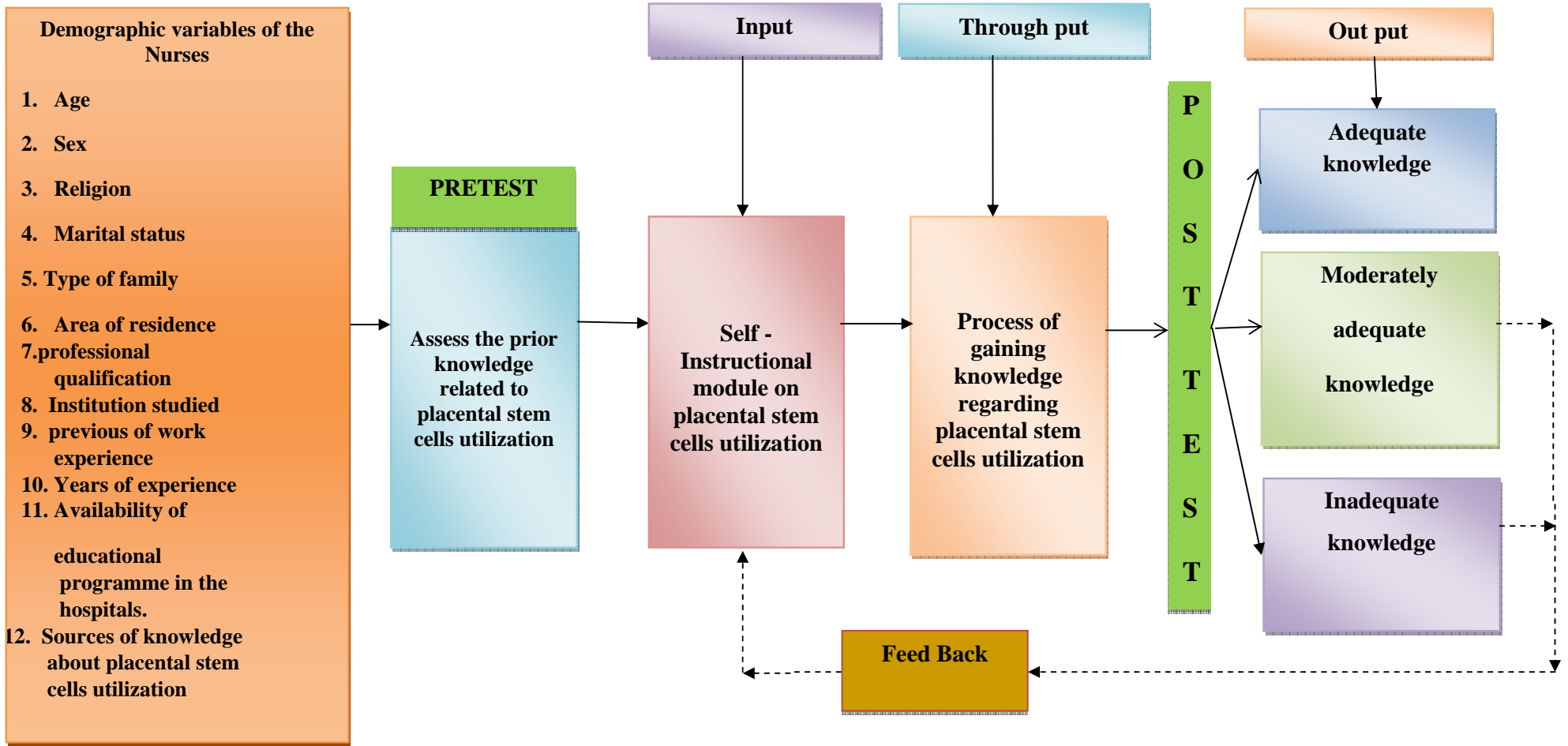


FIGURE 1: MODIFIED CONCEPTUAL FRAME WORK BASED ON J.W. KENNY'S OPEN SYSTEM MODEL (1969)

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Review of literature is the key step in research process. Traditionally it is considered as a systematic and critical review of the most important published scholarly literature relevant to research project.

Review of literature is defined as a broad, comprehensive, in – depth, systematic and critical review of scholarly publication, unpublished scholarly print materials and audio visual materials.

**Literature review for the present study has been collected and presented under the following sections:**

Literature related to:

1. Placenta- an alternative sources of stem cells
2. Isolation and characterization of stem cells from the placenta
3. Placental cord blood collection
4. Placental cord blood preservation
5. Placental stem cells utilization
6. Knowledge regarding placental stem cells utilization

## **SECTION I**

### **LITERATURE REVIEW RELATED TO PLACENTA- AN ALTERNATIVE SOURCES OF STEM CELLS**

**Tsai MS, (2006)**, conducted an experimental study in Taiwan, which showed recent evidence that amniotic fluid is a novel source of fetal stem cells for therapeutic transplantation. The study suggested that besides being an easily accessible and expandable source of stem cells, amniotic fluid will provide a promising source of neural progenitor cells that is used for neurodegenerative disease and nervous system injuries.

**Matikainen T, 2005**, conducted a study about source of stem cells are cellular replacement therapies in human diseases and toxicological screening of candidate drug molecules. Since placenta, umbilical cord, and amnion are normally discarded at birth, they provide an easily accessible alternative source of stem cells. We review the potential and current status of the use of adult stem cells derived from the placenta or umbilical cord in therapeutic application.

## **SECTION II**

### **LITERATURE REVIEW RELATED TO ISOLATION AND CHARACTERIZATION OF STEM CELLS FROM THE PLACENTA**

**Parolini o, (2008)**, conducted a study about isolation and characterization of placental stem cells. Placental tissue draws great interest as a source of cells for regenerative Medicine because of the phenotypic plasticity many of the cell types isolated from this tissue. The aim of this review of is to summarize and provide the state of the art of research in this field, addressing aspects such as cell isolation protocols and characteristics of these cells as well as providing preliminary indications of the possibilities for use of these cells in future clinical applications.

**Dello D M, (2007)**, conducted a study to compare the hematopoietic stem cells with placental cord blood in children hospital and research centre, Oakland. Placental hematopoietic progenitors were isolated using the basic method of isolation of enzymatic digestion treatment of placental cells and staining them. At least three preparations of same type were analyzed. Placental samples from 5.4 weeks to 39.5

weeks were analyzed for cells expressing both cd34 and cd45 hematopoietic progenitors cell surface markers, and it was observed that frequency of placental cells was cd34+ cd45(2.86-20.91%) and cd34++cd45low(0.03-1.2%) that was significantly more than hematopoietic progenitors cell that were found in placental cord blood. In addition to multipotent progenitors, the placenta contained myeloid and erythroid committed progenitors indicative of active in-situ hematogenesis. These data suggest that the human placenta is important hematopoietic stem cells along with placental cord blood for transplantation.

**Miao Z, (2006)**, conducted a study about the isolation of mesenchymal stem cells from human placenta. Mesenchymal stem cells from all of the sources can be extensively expanded in vitro and when cultured under specific permissive conditions retain their ability to differentiate into multiple lineages including bone, cartilage, fat, muscles, and nerve glial and stromal cells. He suggested that placenta derived cells have multi lineage differentiate potential similar to mesenchymal stem cells in terms of morphology and cell surface antigen expression.

**Huang HI. (2005)**, conducted a study about isolation of multipotent cells from human term placenta. Current sources of stem cells

include embryonic stem cells and adult stem cells. They have isolated a population of multipotent cells from the human term placenta, a temporary organ with fetal contributions that is discarded post-partum. This placenta derived multipotent cells exhibit many markers common to mesenchymal stem cells.

### **SECTION III**

#### **LITERATURE REVIEW RELATED TO PLACENTAL CORD BLOOD COLLECTION**

**Lyerly A, et al, (2005)** Article on ‘untying the Gordian knot: policies, practices and ethical issues related to banking of umbilical cord blood’ states that consent is necessary for collection of placental cord blood and transplantation required additional information about newborns and their mother. Mother should sign the consent for donation of placental cord blood, permission to test for HIV and other infections and to understand what measures will be used to protect her confidentiality and that of the baby.

**Smith FO, et al, Literature on ‘cord blood stem cells transplantation’** states that immediately after delivery the cord is clamped, placenta is placed in a sterile supporting structure with the umbilical cord hanging through the support. The cord is cleansed with povidone iodine and alcohol, a needle is inserted into umbilical vein,

blood is drain through the needle in to standard collection bag containing anti -coagulant.

**Literature on ‘umbilical cord blood banking’** says that normal procedure to collect placental cord blood is asking the mother and father for their health history, blood test to rule out HIV infections, other blood diseases, signing of consent form. The blood is collected either in immediately after birth of the baby.

**Sauter C, Barker JN,** A study was conducted in Thailand to evaluate the collection system and processing of placental cord blood donation. A comparison of three cord blood collection methods, namely, hanging method after delivery of the placenta, aspiration from in-utero placenta, and the third method is aspiration from in-utero placenta with the help of syringe assisted aspiration were adopted. The study results showed that the third method was the best collection method, but it requires more trained personnel and involved a complicated procedure.

**Wong A, et al, In a study on “cord blood collection before placental delivery” ,at Colombia on (2002)** demonstrated that the median concentrations of nucleated cells and total colony CFU were significantly lower in cord blood after placenta delivery by 9.5% and 11.6% respectively, Hence the study documented strong evidence for



recommending the collection of cord blood before delivery of the placenta.

#### **SECTION-IV**

### **LITERATURE REVIEW RELATED TO PLACENTAL CORD BLOOD PRESERVATION**

In India about 25,000 placental cord blood units had been preserved over the last three years .with more than 80,000 births per day or 26 million births a year, India is poised to be the largest source for placental cord blood in the world.

**Liu K,Jiang Y,(2003)** A study was conducted on “collection, processing and cryopreservation of placental cord blood hematopoietic stem cells” , 3, 744 CBU were stored in Beijing cord blood bank, on which HLA typed with molecular and serological method and depletion of RBC was performed using hydroxyl ethyl starch and cryo-preserved with hydroxyl starch and liquid nitrogen. The results revealed that the mean volume collected from 3,774 CBU was (93+/- 22) ml and mean total nucleated cell count was  $11.2 \times 10^8$  +/-  $5.3 \times 10^8$ . After depletion of RBC, the mean nucleated cell count was  $9.7 \times 10^8$  +/-  $4.6 \times 10^8$  with mean nucleated cell recovery of 79%.

**Motta JPR, Gomes BE,** A study was conducted in Brazil to evaluate bio antioxidants in cryopreservation of placental cord blood using cryo-protectants and low concentrations of dimethylsulphoxide. Placental cord blood was processed and subjected to cryopreservation in solutions containing different concentrations of dimethylsulphoxide, bio antioxidants and disaccharides. The study results showed that antioxidants, principally catalase, performed greater preservation of CD34+ cells, CD123+ cells, colony forming units, and cell viability compared with the standard solution of cryopreservation. The study was concluded that the addition of catalase improved the cryopreservation outcome.

**Ordemann R, (2000),** A study was conducted on “Experience of the cord blood bank in Dresden”, where 2200 placental cord blood units were collected, out of which 60% of the samples had to be discarded because of insufficient quality. (Low volume cell count, bacterial contamination, positive infectious disease) However 40% of placental cord blood units met all quality control criteria and were cryopreserved. Therefore the study concluded that the cryopreservation and banking of increased number of placental cord blood units should be continued worldwide and should be supported by the general public.

## **SECTION-V**

### **LITERATURE REVIEW RELATED TO PLACENTAL STEM CELLS UTILIZATION**

**The chaitanya stem cell-center, (2011)**, conducted a study by treated more than 70 cases of cerebral palsy. The stem cell therapy is a drug free alternative focused on affecting physical changes in the brain that can improve a child's quality of life. Most cerebral palsy patients are treated by lumbar puncture injecting the stem cells in to the cerebrospinal fluid which transports them up the spinal canal and into the brain. The stem cell therapy is used to induce regeneration in various neurological disorders, including cerebral palsy. Almost, 70% of the cerebral palsy patients treated with stem cells at the chaitanya stem cell- center showed improvement.

**The research conducted by a team of doctors at Bangalore-based stempeutics Research, (2011)**, concluded that in India gets over 20,000 cases of spinal cord injury patients every year. The treatment used for a new mesenchymal stem cells therapy has shown promising results. It was injected either intra- arterially or through intra-spinal route. This new technique of injecting stem cells to the site of injury showed good results.

**Chaitanya stem cell therapy center, (2011)**, conducted a study on spinal cord injury treatment is unique because it focuses on repairing damaged tissue and restoring function to improve each patient quality of life. The patients are treated by injecting stem cells directly into damaged area or in the cerebrospinal fluid which flows within the spinal canal. The study reported was after treatment 60 patients was regaining sensation; More than two-thirds increased muscle strength, and 26-40% patients experienced better bladder and bowel control and improved erections. Over 50% patients reported decreased spasticity and limb pain.

**Mankikar SD, (2010)**, conducted a study on “A new paradigm in medical therapeutics” states that stem cell therapies also provide alternative solution for the repair and regeneration of various tissues and organs. The stem cell infusion, transplantation, and implantation are accepted curative therapies for malignant and non-malignant diseases. Stem cells are found to secrete angiogenic cytokines that increase neovascularization. In this study bring the promise of curing a disease state as possible alternative for the treatment of different diseases such as juvenile diabetes, amyotrophic lateral sclerosis, cerebral palsy, stroke, spinal cord injury, and parkinson’s disease.

**Benito AI, Diaz MA, (2009,)** conducted a study on “transplantation of unrelated donor placental cord blood for non

malignant diseases” in Taiwan among 45 patients on MAY 2009. Incidences of neutrophils engraftment were 88% and platelet engraftment was 82%. Incidence of GVHD 42%, 5 years overall survival 88% and disease free survival 77.1%. Incidence of treatment related mortality at 2 years 12% and identified that unrelated placental cord blood transplantation is a promising approach for curative therapy of nonmalignant diseases.

**A news article from Medical news today on Feb 20, (2008),** ‘placental cord blood stem cells and cardio vascular diseases’ says that permanent loss of cardiomyocytes and the formation of scar tissue following a heart attack results in irreversible damage to Cardiac function. Human placental cord blood contains different types of stem cells including hematopoietic, endothelial and mesenchymal stem cells. Although still in early stages, four in vitro studies have shown that under certain treatment, it can able to induce regeneration of healthy cells from damaged cardiomyocytes. This study suggests that cord blood stem cells have high potential to differentiate in to cardiomyocytes lost due to heart damage.

**Eapen M, (2007),** A comparison study was conducted in USA, on the outcome of transplantation of unrelated donor placental cord blood and bone marrow in children with acute leukaemia. Outcomes of 503

children (below 16 years) with acute leukaemia and transplanted with placental cord blood were compared with outcomes of 282 bone marrow recipients. placental cord blood recipients were transplanted with grafts that were Human Leukocyte Antigen matched or Human Leukocyte Antigen mismatched, bone marrow recipients were transplanted with graft that were matched at allele level. In comparison, The 5 years leukaemia free survival was similar to that after transplant of placental cord blood mismatched for one or more antigen and possibly higher after transplant of HLA matched placental cord blood.

**Malar J, (2006)**, conducted a study on ‘placental whole blood transfusion for patients with anemia in the back ground of confirmed malaria’ at Calcutta. The fresh cord blood was transfused to 39 patients whose hemoglobin was less than 8Gms. The rise of hemoglobin within 72 hours of two units of freshly collected placental cord blood transfusion was 0.5gms to 1.6mg/dl. No clinical reaction has been encountered. This study suggest that properly screened placental cord blood is safe for transfusion in victims of several malarial anemia who need transfusion support.

**Mishan K, (2004)**, A study was conducted to investigate placental blood as a source of hematopoietic stem cells for transplantations into unrelated recipients by duke university medical centre, USA. Twenty five

consecutive patients, primarily children were evaluated for hematogenic and immunologic reconstitution. Human leukocyte antigen (HLA) matching was done before transplantation by serologic typing and best match was selected. In 23 of the 25 transplant recipients, the infused hematopoietic stem cells engrafted. Acute graft versus host disease occurred in 2 of the 21 patients who could be evaluated and 2 patients had chronic graft versus host disease. In-vitro proliferative responses of T cells and B cells to plant mitogens were detected 60 days after the transplantation. With the median follow up 13 months and a minimal follow up of 100 days, the overall 100 days survival rate among these patients was 64% and overall event free survival rate was 48%. Study concluded that HLA mismatched placental blood from unrelated donors is an alternate source of stem cells for hematopoietic reconstitution in children.

**Li CK, (2004)**, conducted a retrospective study in china to review the outcomes of unrelated placental cord blood transplantation in children cord blood. Records of 8 patients who received placental cord blood transplants were reviewed. The median age of the patients was 4.9 years, 5 patients had acute leukaemia, one had non-Hodgkin's lymphoma, one had x-linked adrenoleukodystrophy, and one had Mucopolysaccharidosis. The infused placental cord blood contained median of  $6.7 \times 10^7$  per kg nucleated

cells, and  $4.0 \times 10^5$  kg CD34 positive cells. At a median follow up of two years, 4 patients with leukaemia and one with non-Hodgkin's lymphoma remained in continuous remission, patients with adrenoleukodystrophy showed stabilization of neurological condition. In conclusion, the placental cord blood units of good quality for transplantation, had outcome comparable to that of bone marrow transplantation.

**Bhattacharya N, Mitra R, et al, (2002)**, An experimental study was conducted in Calcutta on 12 patients aged (45-75 years) with prolonged history of parkinsonism, who were not responding for anti-parkinsonian drugs and to find out whether human fetal cortical brain tissue transplant (up to 20 weeks) sustain its metabolic and oxygen requirement in a heterotropic site outside the brain. Evaluation of the patients after one month revealed mild improvement up to 33.3% in 41.6% of cases, and moderate improvement (up to 66.6%) in another 41.6% of cases. Hence, the study concluded that fetal cortical brain tissue, can sustain life in sex randomized, Human Leukocyte Antigen randomized, adult host, without immunosuppressive drugs.

**Korbling M, Katz A et al, (2002)**, In study on "treatment of leprosy patients with anemia by placental umbilical cord whole blood transfusion" on 2002 at south Africa, 15 males and 1 female aged 12-72 years received 2-8 units of freshly collected placental umbilical cord



blood in one transfusion without encountering any clinical, immunological and non-immunological reaction revealed a rise from pre transfusion base level (0.09%), varying from 3.6% to 16.2% in 75% of the cases; without provoking any clinical graft vs. host reaction in any of the leprosy victims.

## **SECTION-VI**

### **LITERATURE REVIEW RELATED TO KNOWLEDGE REGARDING PLACENTAL STEM CELLS UTILIZATION**

**Shini SA (2011)**, A study was conducted on effectiveness of self instructional module on the knowledge regarding placental cord blood utilization and banking among staff nurses in selected hospitals in kasargoad, by approaching one group pre- test post -test design. The sample consisted 60 staff nurses selected by convenient sampling and data was collected by using structured knowledge questionnaire. The result showed the difference suggesting that self- instructional was effective in increasing the knowledge of staff nurses ( $t=14.34$ ). The mean post- test knowledge ( $x_2=43.17$ ) higher than the mean pre test knowledge ( $x_1=30.40$ ). There was association between the age and level of post test knowledge scores and in selected demographic variables.

**Usha M, (2010)**, conducted a study on effectiveness of structured teaching programme on knowledge and attitude regarding utilization of

placental stem cells among staff nurses at selected hospitals in Madurai. The sample consisted 60 staff nurses selected by convenient sampling technique was used. One group pre test and post test design with quasi experimental approach was adopted. The data was collected from 60 respondents before and after administration of structured teaching programme. The result showed the difference suggesting that structured teaching programme was effective in increasing the knowledge of staff nurses ( $t=6[p<0.05]$ ) and attitude of staff nurses ( $t=4.16[p<0.05]$ ). The mean post test knowledge ( $x_2=20.6$ ) higher than the mean pre test knowledge ( $x_1=11.4$ ). The mean post test attitude (66.28) higher than the mean pre test attitude (42.66). There was association between age and level of post test knowledge and attitude among nurses regarding utilization of placental stem cells and in selected demographic variables.

**Elizabeth, (2005)**, conducted a study to evaluate the effectiveness of planned teaching programme on knowledge and attitude of various health professional's regarding placental stem cells and its utilization at selected hospitals in Bangalore. Purposive sampling technique was used. One group pre testpost test design with pre experimental approach was adopted. The data was collected from 50 respondents before and after administration of planned teaching programme. The mean post testknowledge score was ( $x_1=40.5$ ) higher than the mean pre test

knowledge score was( $x_2=20.1$ ). Hence, the planned teaching programme was effective in improving the knowledge of staff nurses.

**Bouzas LF, Paragaussu-BragaFH et al,** conducted a study in Coimbatore to evaluate the effectiveness of structured teaching programme on placental cord blood collection, preservation and utilization. Thirty health professionals were involved in the study. The study result showed that post test score (mean: $39.6\pm 2.57$ ) was higher than the pre test score (mean: $13.23\pm 3.88$ ). It was concluded that structured teaching programme was effective in enhancing the knowledge of health professionals regarding placental cord stem cell collection, preservation and utilization.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

This chapter deals with the methodology followed in the study and is discussed under the following headings. Research approach, Research design, variables, study setting, population, sample, sample size, sampling technique, inclusion and exclusion criteria for selection of samples, development and description of tools, scoring key, content validity, reliability, pilot study, procedure for data collection and plan for data analysis.

#### **RESEARCH APPROACH:**

Quantitative approach was used.

#### **RESEARCH DESIGN:**

Pre- experimental one group pre-test and post-test design was used in this study.

**Q1 × Q2**

**Q1** = Pre test knowledge

**X** = Self instructional module

**Q2** = Post test knowledge

**VARIABLES:****Independent variable:**

Self- instructional module on placental stem cells utilization.

**Dependent variable:**

Knowledge regarding placental stem cells utilization among staff nurses.

**Attribute variable:**

Socio demographic variables such as age, sex, religion, marital status, type of family, area of residence, professional qualification, and institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

**SETTING OF THE STUDY:**

The setting refers to the physical location and conditions where data collection takes place. In this study, research was conducted in Apollo speciality hospital, Madurai and it is situated 40 km's away from the Matha college of nursing. This is 250 bedded hospital along with 150 staff nurses. It has various department like Emergency ward, Medical ward, Surgical ward, Maternity ward, NICU, pediatric ward, ICU, CCU, CT ICU, Stroke unit, oncology ward, operation theater, Cardio thoracic

operation theater, General ward, Renal transplant Unit, Dialysis Unit, etc. The researcher had selected 7 staff nurses from each department for this study.

**POPULATION:**

Both female and male staff Nurses.

**SAMPLE SIZE:**

In this study, the sample size consisted of 100 staff nurses who fulfilled the inclusion criteria working in Apollo Speciality hospitals in Madurai.

**SAMPLING TECHNIQUE:**

Convenience sampling technique was used to select the sample.

**CRITERIA FOR SAMPLE SELECTION:****Inclusion criteria:**

- All registered female and male staff nurses.
- Staff nurses who are willing to participate in the study.
- Staff nurses who understand to read and speak English or Tamil.

**Exclusion criteria:**

- Staff nurses who are not willing to participate in this study.

- Staff nurses who are not available during the period of data collection.
- Other nursing staff like ANM nursing.

**Data collection instruments:**

Structured interview schedule was used to assess the knowledge regarding placental stem cells utilization.

**DESCRIPTION OF THE TOOL****PART I:**

It consists of demographic variables such as age, sex, religion, marital status, type of family, Area of residence, Professional qualification, Institution studied, previous work experience, Years of experience, Availability of educational programme in the hospitals, and Sources of knowledge about placental stem cells utilization.

**PART II:**

It consists of 33 multiple choice items to assess knowledge regarding placental stem cells utilization among staff nurses. All items have one correct response in 3 distracters.

**SCORING PROCEDURE:****PART I:**

It was not scored but analyzed with descriptive statistics.

**PART II:**

Questionnaire on knowledge consists of 33 multiple choice questions. The staff nurses were asked to select an answer in each item. For correct answer the score '1' was given and for wrong answer score '0' was given. The maximum score of the knowledge questions was 33.

The score was categorized as follows

Adequate knowledge	-	29-33
Moderately adequate knowledge	-	15-28
Inadequate knowledge	-	Less than 15

**TESTING OF THE TOOL:****Validity:**

Developed from researcher, the constructed tool used in this study was validated by five nursing experts and also from two obstetricians. The tool was evaluated for appropriateness, adequacy, relevant, completeness and comprehensiveness. Comments and suggestions were invited and appropriate modifications were made accordingly. The tool was refined and finalized, after establishing the validity.



**Reliability:**

The reliability of the tool was tested by test re-test method. The computed coefficient  $r=0.8$  the tool was found to be highly reliable.

**PILOT STUDY:**

The pilot study was conducted in Henna Joseph Hospitals at Madurai. The pilot study was conducted in the same ways as the final study would be done. In order to test the feasibility and practicability, 10 staff nurses who met the inclusion criteria were selected by convenient sampling. The knowledge questionnaire was used. The results were analyzed based on the score obtained by the staff nurses. These subjects were not included in major study.

**DATA COLLECTION PROCEDURE:**

The period of data collection was six weeks in Apollo Speciality hospitals at Madurai. Initially the investigator established rapport with the study subjects. The purpose of the study was explained and received their consent to collect the data day. Seven staff nurses were assessed the interview schedule, the data was collected from staff nurses. The interview lasted for 40 minutes for each sample. Self-Instructional Module was given immediately after pre-test to each sample. It lasted for about 40 minutes. Post-test was assessed with an interval of 15 days after self-instructional module to assess the knowledge regarding placental

stem cells utilization by using the same tool. The working period of data collection 8a.m-1p.m and 5p.m-8.00p.m.

### **DATA ANALYSIS:**

Data was analyzed based on the objectives. Frequency and percentage was computed for describing the sample characteristics. Bio statistical methods such as frequency, percentage, were used to find out the pre-test and posttest knowledge score. Paired t-test was computed to find out the effectiveness of Self Instructional Module. Chi-square test was computed to describe the association between post-test knowledge score of the sample and demographic variables.

### **HUMAN RIGHT PROTECTION:**

The research proposal was approved by the dissertation committee prior to pilot study. Permission was obtained from the head of the obstetrics and gynecological nursing department of Matha College of nursing. Permission was also obtained from the HR manager of the Apollo Speciality hospitals, in Madurai, before conducting the study. The oral consent was obtained from each participant of the study before starting the data collection. Assurance was given to the subjects that anonymity of each individual would be maintained.

## **CHAPTER IV**

### **DATA ANALYSIS AND INTERPRETATION**

This Chapter presents the analysis and interpretation of data collected from a sample of 100 staff nurses' knowledge regarding placental stem cells utilization. Data was analyzed based on the objectives. Frequency and percentage was computed for describing the sample characteristics. Bio-statistical methods such as frequency, percentage, mean, standard deviation was used to find out the pretest and post- test knowledge scores. Paired 't'test were computed to find out the effectiveness of Self Instructional Module. Chi- square test was computed to describe the association between post-test knowledge score with demographic variables.

#### **OBJECTIVES**

1. To assess the pre-test knowledge score regarding placental stem cells utilization.
2. To assess the post-test knowledge score regarding placental stem cells utilization.
3. To evaluate the effectiveness of Self Instructional Module on placental stem cells utilization.
4. To find out the association between the post- test level of knowledge score with selected demographic variables among

nurses such as age, sex, religion, marital status, type of family, area of residence, professional qualification, institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

## **ORGANIZATION OF STUDY FINDINGS**

The data were analyzed and presented under the following section.

### **Section I**

Distribution of samples according to their demographic variables

### **Section II**

Distribution of pre-test knowledge score regarding placental stem cells utilization.

### **Section III**

Distribution of post-test knowledge score regarding placental stem cells utilization.

### **Section IV**

Effectiveness of mean pre-test and post-test knowledge scores of the samples

### **Section V**

Association between post-test knowledge scores and demographic variables.

## SECTION-1

**Table-I Distribution of samples according to their demographic variables**

**N=100**

<b>S. NO</b>	<b>Name of the variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>1</b>	<b>Age</b>		
	a) 22-25 years	62	62
	b) 26-30 years	26	26
	c) Above 30 years	12	12
<b>2</b>	<b>Sex</b>		
	a) Male	10	10
	b) Female	90	90
<b>3</b>	<b>Religion</b>		
	a) Hindu	46	46
	b) Christian	52	52
	c) Muslim	02	02
<b>4</b>	<b>Marital status</b>		
	a) Married	37	37
	b) Un-married	63	63

<b>S. NO</b>	<b>Name of the variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>5</b>	<b>Type of family</b>		
	a) Nuclear	76	76
	b) Joint	24	24
<b>6</b>	<b>Area of residence</b>		
	a) Urban	56	56
	b) Rural	44	44
<b>7</b>	<b>Professional qualification</b>		
	a) GNM	38	38
	b) B. sc. Nursing	37	37
	c) Pc. B. sc. Nursing	25	25
<b>8</b>	<b>Institution studied</b>		
	a) Govt. colleges of Nursing	29	29
	b) Govt.School of Nursing	39	39
	c) Non-Govt. college of Nursing	32	32
<b>9</b>	<b>Previous work experience</b>		
	a) Maternity ward	28	28
	b) Neonatal ward	37	37
	c) Medical ward	27	27
	d) Surgical ward	08	08

<b>S. NO</b>	<b>Name of the variables</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>10</b>	<b>Years of experience</b> a) 1-5 years b) 6-10 years c) 11-15 years d) More than 15 year	72 22 03 03	72 22 03 03
<b>11</b>	<b>Availability of educational Programme</b> a) Continuing education b) In-service education c) Work shop d) Conference	22 35 34 09	22 35 34 09
<b>12</b>	<b>Source of knowledge about Placental stem cells utilization</b> a) Electronic Media b) Print Media c) Stem cells banks • News letters • Pamphlets d) Friends and relatives	16 28  43 07 06	16 28  43 07 06

Table 1 shows that among the nurses majority, 62 (62%) of them belongs to the age group of 22-25 years, 26(26%) belongs to the age group of 26-30 years, 12 (12%) belongs to above 30 years of age group.

In relation with sex of majority, nurses 90 (90%) belongs to females, whereas 10 (10%) belongs to males.

With regard to religion majority 52 (52%) of them Christians, 46 (46%) were Hindus and 2(2%) were Muslims.

Among the nurses majority, 63 (63%) belongs to Un-married and 37 (37%) belongs to married.

With regard to the type of family, majority 76(76%) of them were living in Nuclear family and 24 (24%) were living in joint family.

With regard to area of residence, Majority 56(56%) of them living in urban area and 44 (44%) were living in rural areas.

Regarding majority of the nurses 38 (38%) belongs to GNM, whereas 37 (37%) belongs to B. sc. Nursing and 25 (25%) belongs to Pc.B.sc. Nursing.

In relation to Institution studied, Majority of the nurses 39 (39%) have completed in Govt. School of nursing, whereas 32 (32%) have



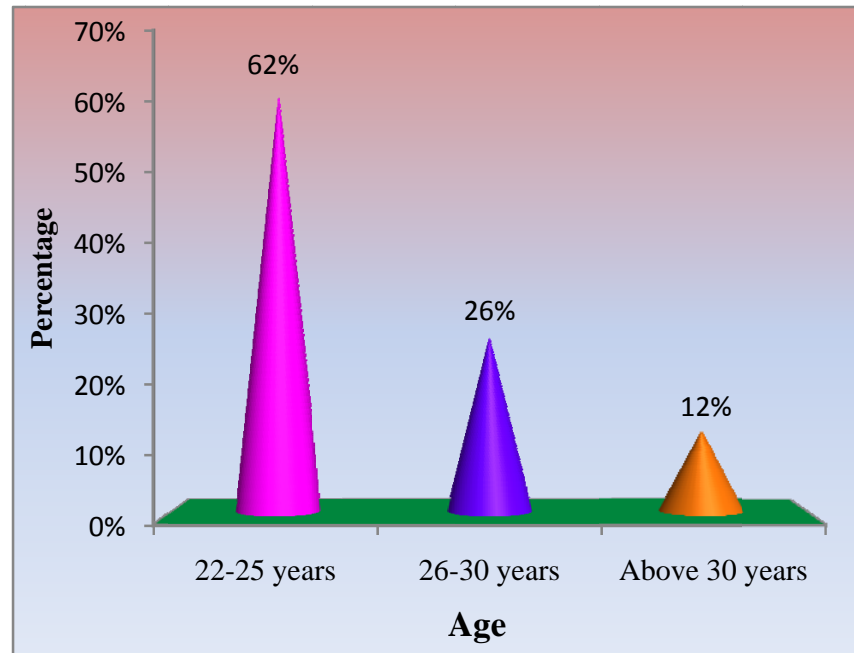
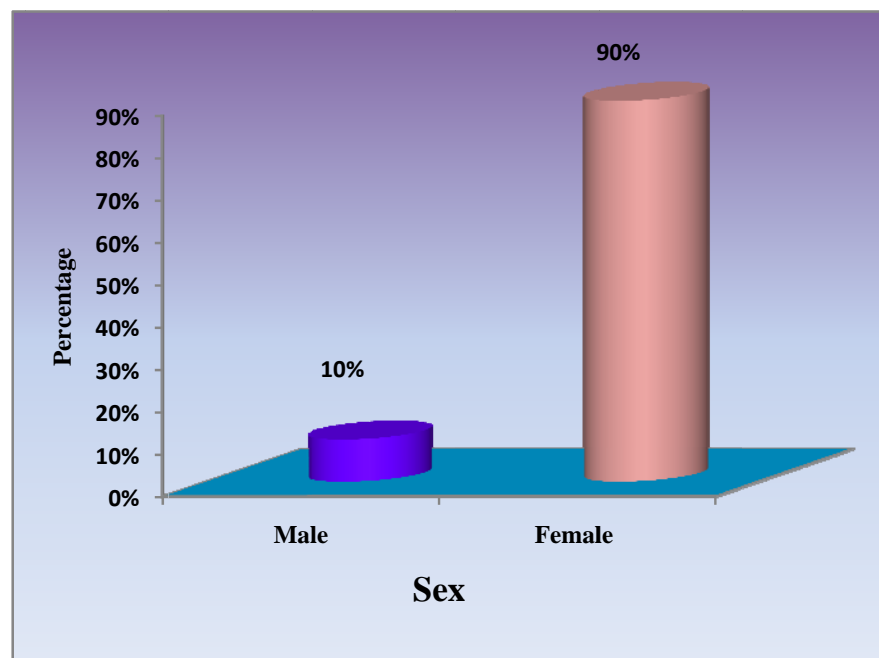
completed in Non –Govt. college of nursing and 29 (29%) have completed in Govt. college of nursing.

In relation to previous work experience, Majority of the nurses 37 (37%) had neonatal ward, whereas 28 (28%) had Maternity ward, 27 (27%) had Medical ward and 8 (8%) had Surgical ward.

In relation to years of experience, Majority of the nurses, 72 (72%) belongs to 1-5 years , whereas 22 (22%) belongs to 6-10 years , 3 (3%) belongs to 11-15 years and 3 (3%) belongs to More than 15 years.

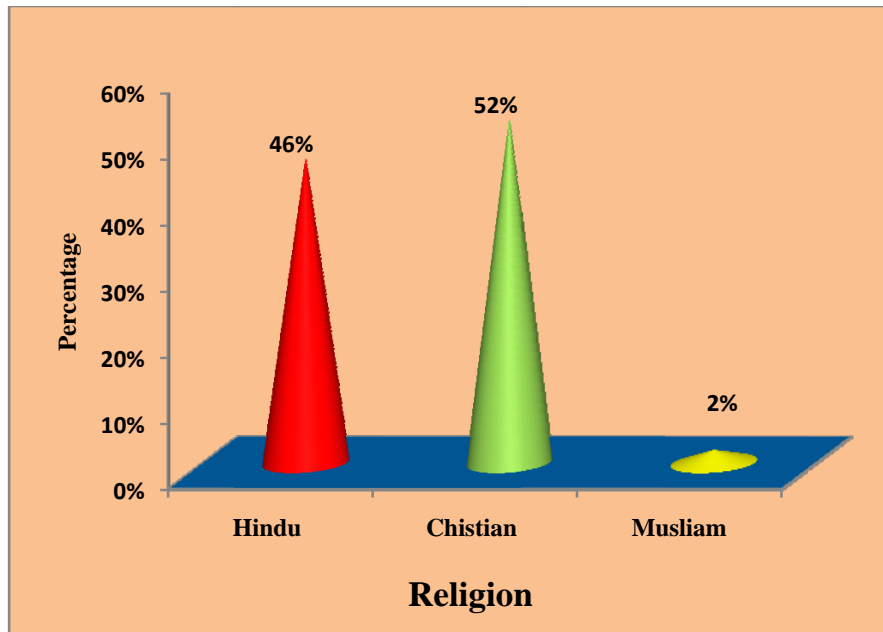
Regarding majority of the nurses 35 (35%) had In- service education, whereas 34 (34%) had work shop, 22 (22%) had continuing education and 9 (%) had conference.

With regards to source of knowledge regarding placental stem cells utilization majority of the nurses, 43 (43%) got information from stem cell banks- Newsletters, 28 (28%) got information from Print media, 16 (16%) got information from Electronic media, 7 (7%) got information from stem cells banks- pamphlets, and 6 (6%) got information from Friends and relatives.

**Figure:2 DISTRIBUTION OF SAMPLES ACCORDING TO AGE****N=100****Figure:3 DISTRIBUTION OF SAMPLES ACCORDING TO SEX****N=100**

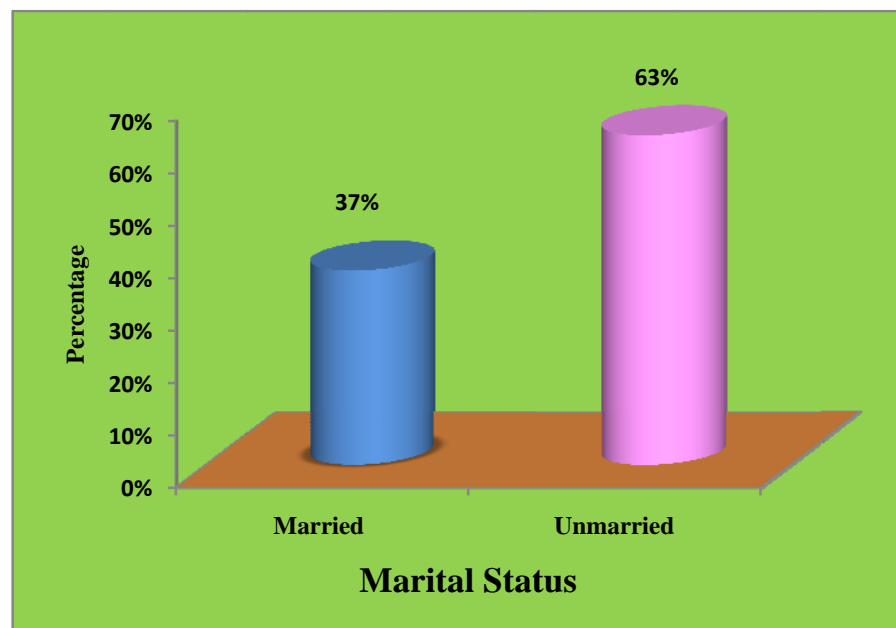
**Figure :4DISTRIBUTION OF SAMPLES ACCORDING TO RELIGION**

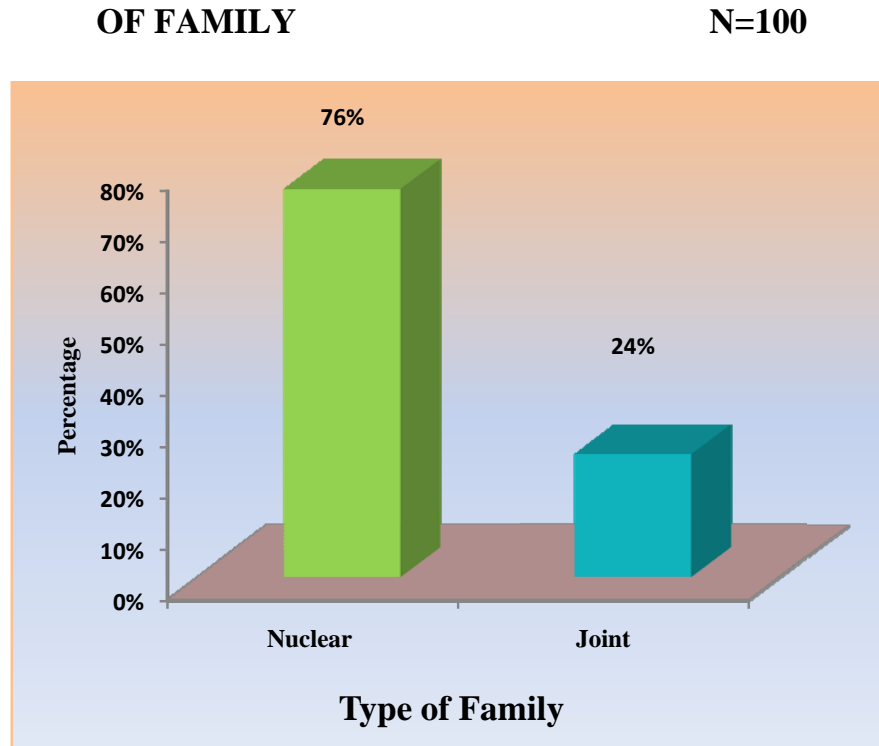
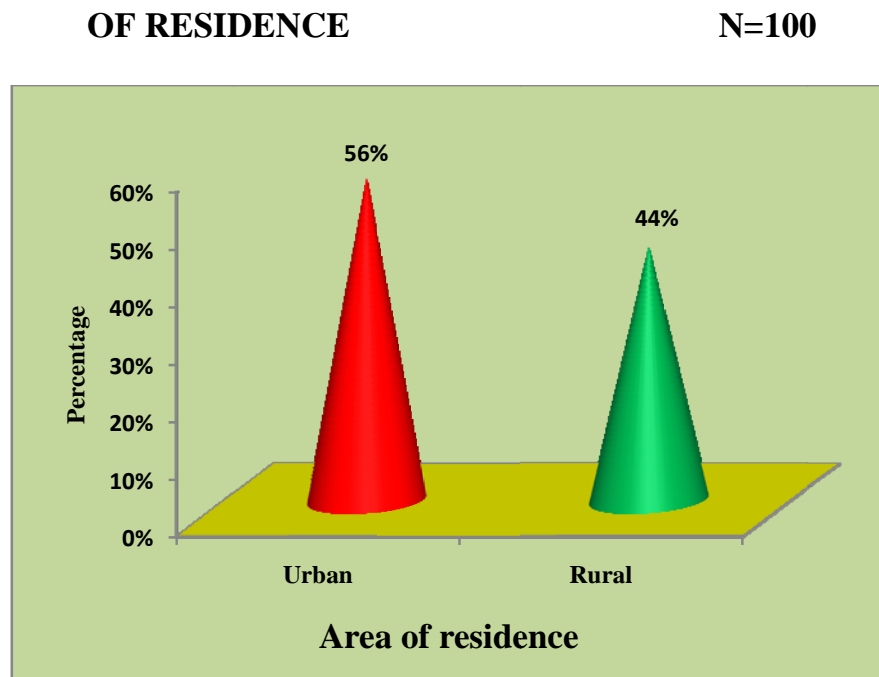
**N=100**



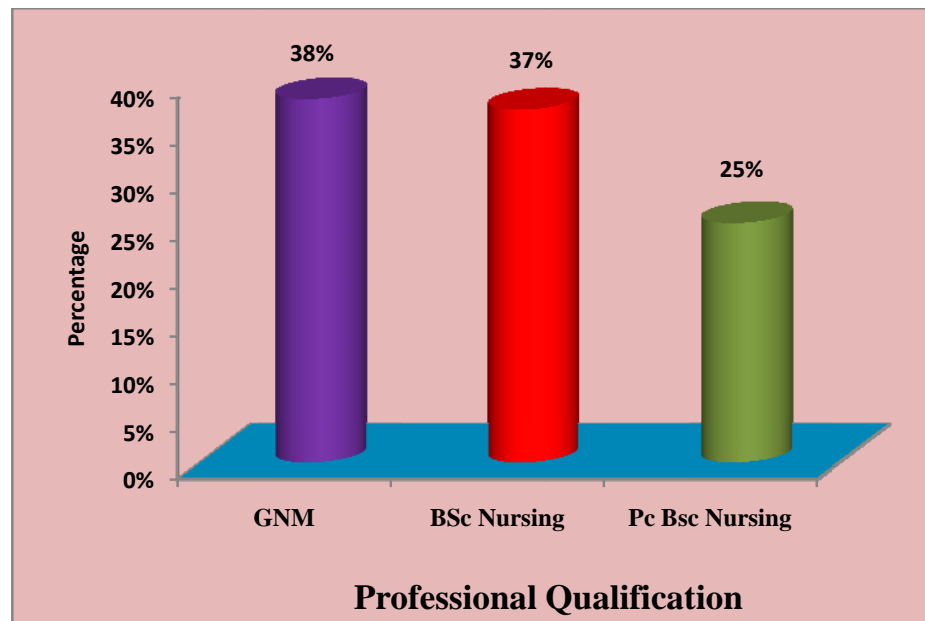
**Figure:5 DISTRIBUTION OF SAMPLES ACCORDING TO MARITAL STATUS**

**N=100**

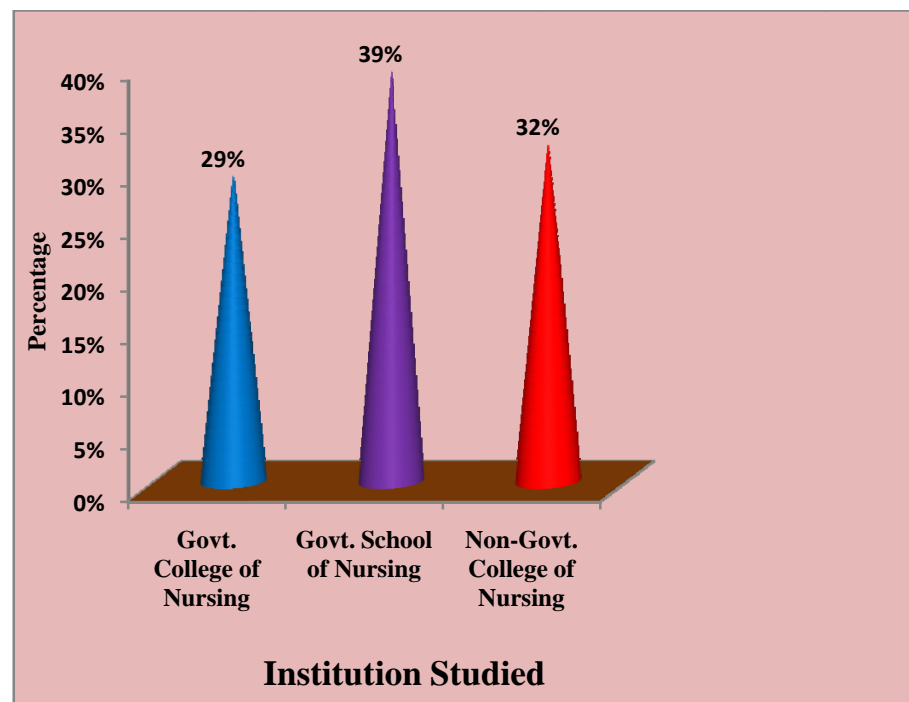


**Figure:6 DISTRIBUTION OF SAMPLES ACCORDING TO TYPE****Figure:7 DISTRIBUTION OF SAMPLES ACCORDING TO AREA**

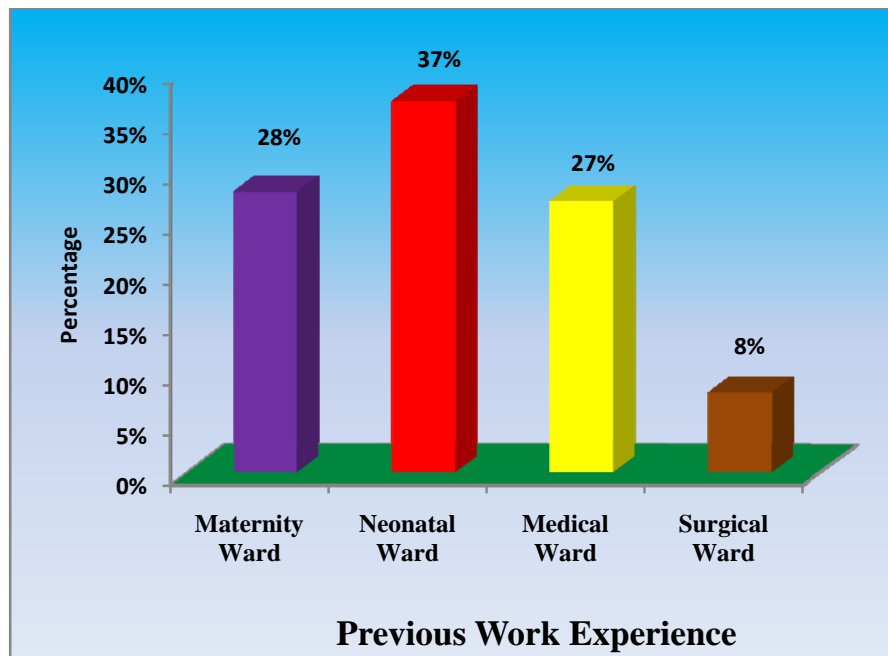
**Figure:8 DISTRIBUTION OF SAMPLES ACCORDING TO PROFESSIONAL QUALIFICATION N=100**



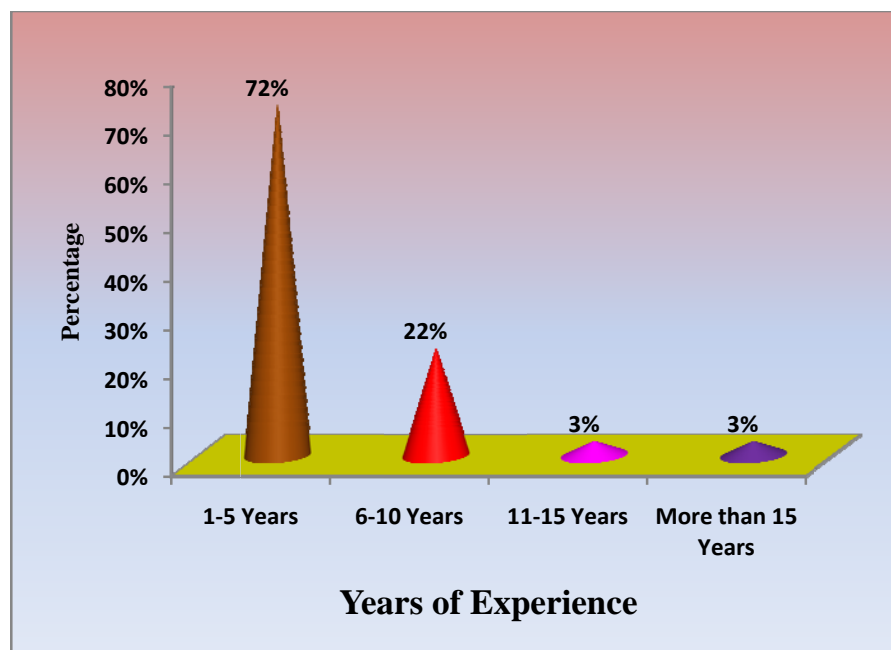
**Figure:9 DISTRIBUTION OF SAMPLES ACCORDING TO INSTITUTION STUDIED N=100**



**Figure:10 DISTRIBUTION OF SAMPLES ACCORDING TO  
PREVIOUS WORK EXPERIENCE N=100**

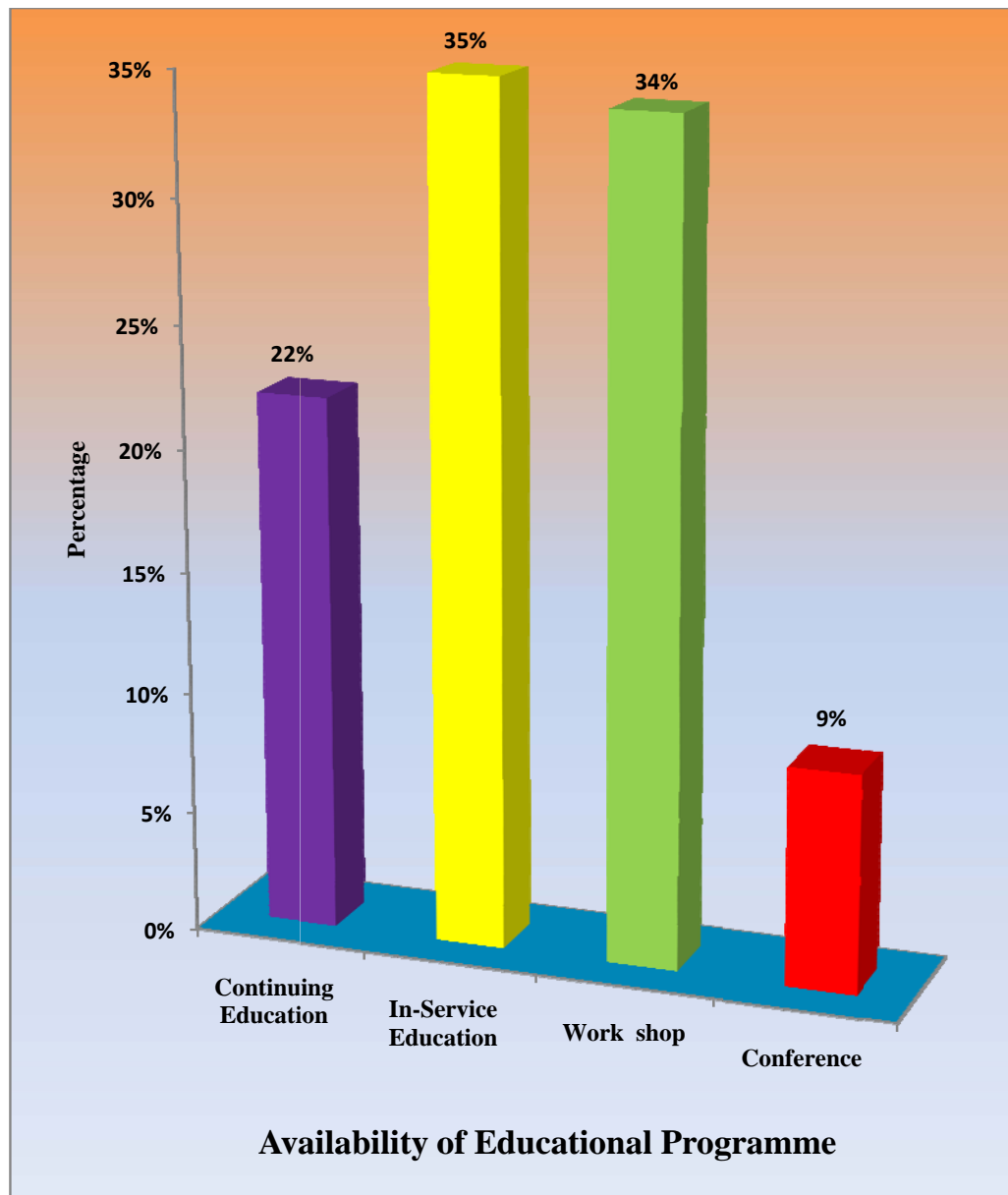


**Figure:11 DISTRIBUTION OF SAMPLES ACCORDING TO  
YEARS OF EXPERIENCE N=100**



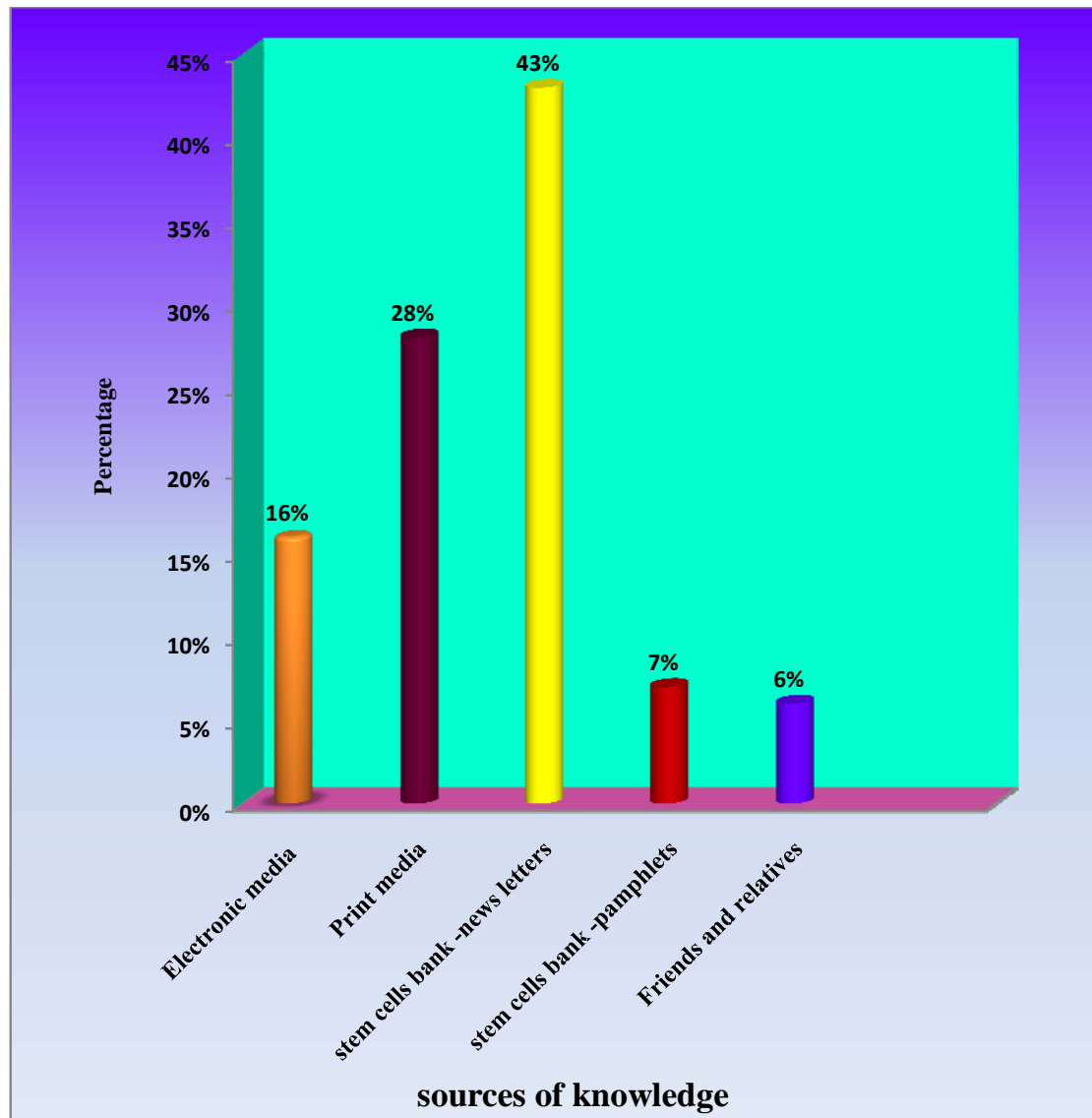
**Figure:12 DISTRIBUTION OF SAMPLES ACCORDING TO AVAILABILITY OF EDUCATIONAL PROGRAMME**

**N=100**



**Figure:13 DISTRIBUTION OF SAMPLES ACCORDING TO SOURCES OF KNOWLEDGE ABOUT PLACENTAL STEM CELLS UTILIZATION**

**N=100**





## SECTION II

**Table 2: Distribution of pre-test knowledge score regarding placental  
Stem cells utilization**

S.NO	LEVEL OF KNOWLEDGE	PRE-TEST	
		FREQUENCY	PERCENTAGE (%)
1.	Adequate knowledge	1	1
2.	Moderately adequate knowledge	45	45
3.	Inadequate knowledge	54	54

The above table 2 shows that the frequency and percentage distribution of sample according to the level of knowledge in the pre-test. The pre-test score reveals that 54 (54%) nurses had inadequate knowledge, 45 (45%) had moderately adequate knowledge, 1 (1%) had adequate knowledge regarding placental stem cells utilization.

### SECTION III

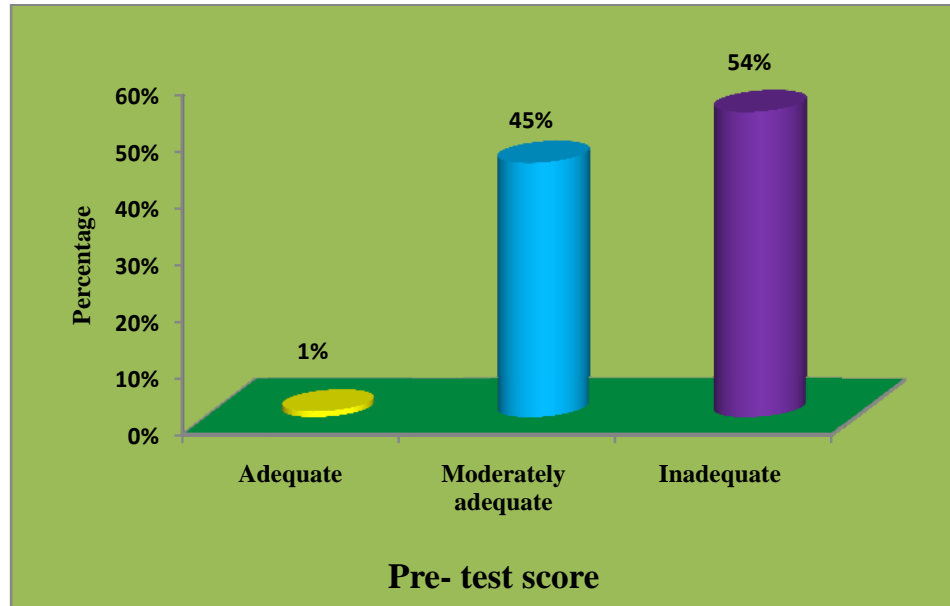
**Table:3 Distribution of post-test knowledge score regarding placental  
Stem cells utilization**

S.NO	LEVEL OF KNOWLEDGE	POST-TEST	
		FREQUENCY	PERCENTAGE (%)
1.	Adequate knowledge	33	33
2.	Moderately adequate knowledge	67	67
3.	Inadequate knowledge	0	0

The above table 3 shows that the frequency and percentage distribution of sample according to the level of knowledge in the post-test. After administered Self Instructional Module the post-test score 33 (33%) nurses had adequate knowledge, 67(67%) had moderately adequate knowledge and none of them had inadequate knowledge regarding placental stem cells utilization.

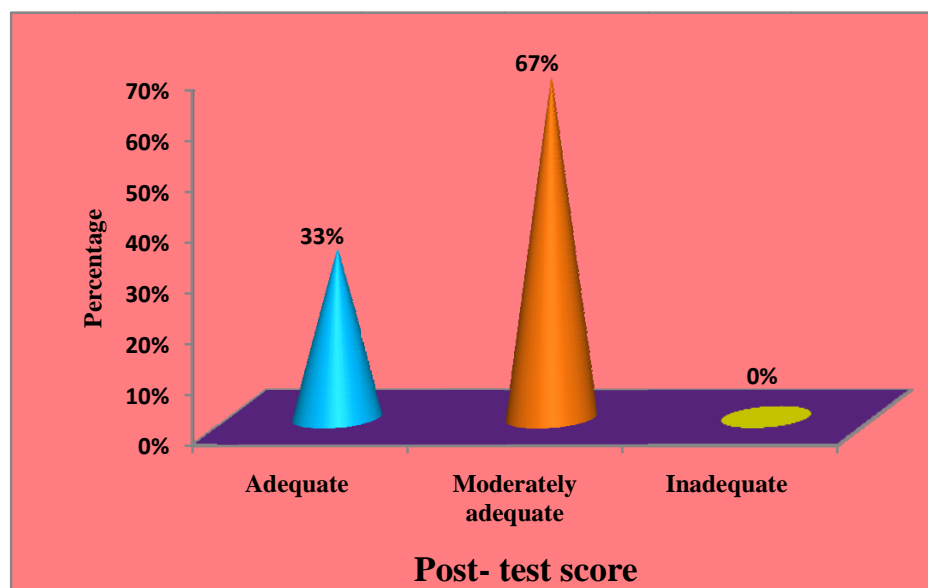
**Figure:14 DISTRIBUTION OF PRE-TEST KNOWLEDGE SCORE REGARDING PLACENTAL STEM CELLS UTILIZATION**

**N=100**



**Figure:15 DISTRIBUTION OF POST -TEST KNOWLEDGE SCORE REGARDING PLACENTAL STEM CELLS UTILIZATION**

**N=100**



## SECTION IV

**Table 4: Effectiveness of mean pre-test and post-test knowledge score of the samples**

<b>Knowledge</b>	<b>N</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>'t' test</b>
Pre-test	100	16.00	4.383	<b>35.178</b> <b>P&lt;0.05significant</b>
Post-test	100	28.00	2.832	

Data on table shows that the mean posttest knowledge score of the subjects 28.00 is higher than the mean pretest knowledge score 16.00. The calculated 't' value 35.178 is greater than of table value (1.984) at 0.05 level of significance.

In order to test the significance of difference between the mean pretest knowledge score and mean posttest knowledge score, the following null hypothesis was stated.

$H_{01}$  There will be no significant relationship between the mean pretest knowledge score and the mean posttest knowledge score of staff nurses regarding placental stem cells utilization, were tested by using paired 't' test.

The mean posttest knowledge of nurses regarding placental stem cells utilization is higher than the mean pretest knowledge score. The obtained 't' value is significant at 0.05 level. Since the obtained 't' value is higher than the table value the researcher rejects null hypothesis and above findings supports research hypothesis. Therefore it was concluded that there was a difference between the mean pretest knowledge score and mean posttest knowledge score regarding placental stem cells utilization.

It shows the effectiveness of the self –instructional module on the level of knowledge regarding placental stem cells utilization.

## SECTION V

**Table:5 Association between post- test knowledge scores and  
Demographic variables**

S. NO	Demographic variables	Adequate	Moderately adequate	Chi-square	
				Table value	Calculated value
1.	<b>Age</b> a) 22-25yrs b) 26-30yrs c) above 30yrs	22 07 04	40 19 08	5.99	0.608 <sup>NS</sup>
2.	<b>Sex</b> a) Male b) Female	04 29	06 61	3.84	0.246 <sup>NS</sup>
3.	<b>Religion</b> a) Hindu b) Christian c) Muslim	15 18 0	31 34 02	5.99	1.050 <sup>NS</sup>
4.	<b>Marital status</b> a) Married b) Un-married	13 20	24 43	3.84	0.121 <sup>NS</sup>

S. NO	Demographic variables	Adequate	Moderately adequate	Chi-square	
				Table Value	Calculated value
5.	<b>Type of family</b> a) Nuclear b) Joint	24 09	52 15	3.84	0.289 <sup>NS</sup>
6.	<b>Area of residence</b> a) Urban b) Rural	07 26	49 18	3.84	24.191 <sup>S</sup>
7.	<b>Professional qualification</b> a) GNM b) B.sc.Nursig c) Pc.B.sc nursing	01 07 25	37 30 0	5.99	69.926 <sup>S</sup>
8.	<b>Institution studied</b> a) Govt.colleges of nursing b) Govt.school of nursing c) Non-Govt. College of Nursing	0 01 32	29 38 0	5.99	95.593 <sup>S</sup>

S. NO	Demographic variables	Adequate	Moderately adequate	Chisquare	
				Table Value	Calculated Value
9.	<b>Previous work Experience</b>  a) Maternity ward b) Neonatal ward c) Medical ward d) Surgical ward	0 01 25 07	28 36 02 01	7.82	83.266 <sup>S</sup>
10.	<b>Years of experience</b>  a) 1-5 years b) 6-10 years c) 11-15years d) > 15years	27 04 01 01	45 18 02 01	7.82	2.845 <sup>NS</sup>
11	<b>Availability of educational programme</b>  a) Continuing Education b) In-service Education c) Work shop d) Conference	0 0 28 05	22 35 06 04	7.82	67.601 <sup>S</sup>



S. NO	Demographic variables	Adequate	Moderately adequate	Chisquare	
				Table Value	Calculated Value
12.	<b>Source of knowledge about placental stem cells utilization</b>				
	a) Electronic media	0	16		
	b) Print media	0	28		
	c) Stemcells banks			9.49	40.514 <sup>S</sup>
	-Newsletters	24	19		
	-pamphlets	04	03		
	d) Friends and relatives	05	01		

**S-Significant at 0.05 level**

**NS -Non significant at 0.05 level**

The table 5 shows that there is a significant association between mean post- test knowledge score and demographic variables. The result shows there is a significant association between area of residence, professional qualification, institution studied, previous work experience, Availability of educational programme, source of knowledge about placental stem cells utilization. Other demographic characteristics did not show association with knowledge regarding placental stem cells utilization.

## CHAPTER V

### DISCUSSION

This study to evaluate the effectiveness of self- instructional module on knowledge regarding placental stem cells utilization among staff nurses. Pre experimental design one group pretest posttest design was used to conduct the study.

Interview schedule was used to assess the knowledge of staff nurses regarding placental stem cells utilization. The convenience sampling technique was used for selecting the sample to conduct the study.

This study consists of 100 samples of placental stem cells utilization among staff nurses. The study findings are discussed in this chapter with reference to the objectives. The framework and hypothesis are stated in chapter I.

#### **The objectives of the study were:**

1.To assess the pre-test level of knowledge regarding placental stemcells utilization.

2.To assess the post-test level of knowledge regarding placental stemcells utilization.

3. To evaluate the effectiveness of self Instructional module on placental stem cells utilization.

4.To find out the association between the post -test level of knowledge with selected demographic variables among nurses such as age, sex, religion, marital status, type of family, area of residence, professional qualification, institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

## **OBJECTIVES**

**1. To assess the pretest knowledge score regarding placental stem cells utilization.**

The table 2 shows thatthe pre -test score reveals that 54 (54%) samples had adequate knowledge, 45 (45%) samples had moderately adequate knowledge. 1 (1%) had adequate knowledge.

The findings are consistent with the study done by;**Elizabeth,(2005)**a study was conducted to evaluate the effectiveness of planned teaching programme on knowledge regarding placental stem cells and its utilization among various health professionals at selected hospital in Bangalore. Purposive sampling was used. Pre experimental one group pre-test post-test design with quantitative approach was adopted. The data was collected from 50 samples before and after

administration of planned teaching programme. The mean post –test knowledge score was ( $x_2=40.5$ ) higher than the mean pre-test knowledge score was ( $x_1=20.1$ ).

The researcher point of view concluded that most of the samples have moderate and inadequate knowledge regarding placental stem cells utilization this supported the study.

These results showed by evident that samples have difficulty knowing about the placental stem cells utilization.

## **2. To assess the post-test knowledge score regarding placental stem cells utilization.**

The table 3 shows that after administering Self Instructional Module the post test score 33 (33%) samples had adequate knowledge. 67 (67%) samples had moderately adequate knowledge; none of them had inadequate knowledge.

The findings are consistent with the study done by; **Usha M**,(2010), A study was conducted on effectiveness of structured teaching programme on knowledge regarding utilization of the placental stem cells among staff nurses at selected hospitals in Madurai. The samples consisted 60 staffnuses selected by convenient sampling technique was used, One group pre-test and post- test design with quasi experimental

approach was adopted. The data was collected from 60 samples before and after administration of structured teaching programme. The results showed the difference suggesting that structured teaching programme was effective increasing the knowledge of samples the mean post-test knowledge score ( $x_2=20.6$ ) higher than the mean pre-test knowledge ( $x_1=11.4$ ) and ( $t=6p<0.05$ )

Significant this supported the study.

The researcher point of view concluded that the mean post –test score was higher than mean –pretest score so the structured teaching programme was effective in more gaining their knowledge regarding utilization of placental stem cells .

These results shown that samples have more gaining knowledge about post-test score regarding utilization of placental stem cells due to increasing the knowledge level of post test score.

### **3. To evaluate the effectiveness of Self- Instructional Module on placental stem cells utilization**

**H<sub>0</sub>1: There is a significant difference in the score of mean between pre-test and post-test.**

Table 4 shows that the mean post-test knowledge score of the samples 28.00 is higher than the mean pre-test knowledge score

16.00. The calculated 't' value 35.178 is greater than of table value (1.984) at 0.05 level of significance.

The mean post-test knowledge of nurses regarding placental stem cells utilization is higher than the mean pretest knowledge score. The obtained 't' value is significant at 0.05 level. Since the obtained 't' value is higher than the table value at 0.05 level of significance. Therefore it was concluded that there was a difference between the mean pretest knowledge score and mean posttest knowledge score regarding placental stem cells utilization.

The findings are consistent with study done by; **shine SA(2005)**, a study was conducted in among 60 staff nurses in kasargoad. She found the result showed the difference suggesting that self- instructional module was effective in increasing the knowledge of staff nurse ( $t=14.34$ ). The mean post -test knowledgescore ( $x_2=43.17$ ) higher than the mean pretest knowledgescore ( $x_1=30.40$ ).

The researcher point of view, self –instructional module was very effectiveness of compared to the mean post-test knowledge score higher than the mean pre- test knowledge score regarding placental stem cells utilization.

**4. To find out association between the post-test levels of knowledge regarding placental stem cells utilization among staff nurses with demographic variables.**

**H<sub>0</sub>2:** There will not be a significant association of knowledge with selected demographic variables such as Age, Sex, Religion, Marital status, Type of family, years of experience.

**H<sub>1</sub>2:** There will be a significant association of knowledge with selected demographic variables such as Area of Residence, Professional qualification, Institution studied, previous work experience, Availability of educational programme and Source of knowledge about placental stem cells utilization.

**Table 5** shows that there was a significant association of knowledge with selected demographic variables such as Area of Residence, Professional qualification, Institution studied, Previous work experience, Availability of educational programme and Source of knowledge about placental stem cells utilization.

The researcher's point of view is that due to advancement in communication and education, the samples residing in urban areas may have more knowledge and more sources for improving their knowledge. Regarding professional qualification of general nursing and midwifery

staff nurses more clinical experience, continuous in-service education and knowledge may high. Samples coming from government school of nursing as well as institution studied which have stem cells therapy may have more knowledge and experience related to placental stem cells utilization therapy.



## **CHAPTER VI**

### **SUMMARY, IMPLICATION, RECOMMENDATIONS AND CONCLUSION**

This chapter deals with the summary of the study and conclusion drawn. It clarifies the limitation of the study, Implication and recommendation are given for different aspect in nursing practice, nursing education nursing research and general education.

#### **SUMMARY**

A pre experimental study to determine the effectiveness of Self Instructional Module on knowledge regarding placental stem cells utilization among staff nurses in Apollo speciality Hospital at Madurai.

The research approach adopted for this study was quantitative approach and the design used in this study was pre experimental one group pre-test and post-test design. The tool used for this study was knowledge questionnaire. This study was conducted in Apollo speciality hospital, Madurai. Convenient sampling method was used for sample selection. The size of the sample is 100.

## **OBJECTIVES**

1. To assess the pre-test level of knowledge regarding placental stem cells utilization.
2. To assess the post-test level of knowledge regarding placental stem cells utilization.
3. To evaluate the effectiveness of self Instructional module on placental stem cells utilization.
4. To find out the association between the post -test level of knowledge with selected demographic variables among nurses such as age, sex, religion, marital status, type of family, area of residence, professional qualification, institution studied, previous work experience, years of experience, availability of educational programme in the hospitals, sources of knowledge about placental stem cells utilization.

## **HYPOTHESIS**

- 1.The mean post-test knowledge score of nurses who had self-Instructional module regarding placental stem cells utilization will be significantly higher than mean pre-test knowledge score.
2. There will be a significant association between post-test knowledge regarding placental stem cells utilization and the selected demographic variables of nurses.

The instrument used for data collection consisted of 2 sections

Part 1; Demographic data

Part 2; Questionnaire

The gathered data were tabulated, grouped and analyzed. Descriptive and inferential statistics (t-test and chi-square) were used and analysis.

A review of related literature enabled the investigator to develop the conceptual frame work, methodology for the study and analysis of the data was an effective and efficient way.

Here the ultimate goal of the study was to determine the effectiveness of Self Instructional module regarding placental stem cells utilization.

The pilot study was conducted in Henna Joseph Hospitals at Madurai. The pilot study was conducted in the same ways as the final study would be done. In order to test the feasibility and practicability, 10 staff nurses who met the inclusion criteria were selected by convenient sampling. The knowledge questionnaire was used. The results were analyzed based on the score obtained by the staff nurses. These subjects were not included in major study.

The period of data collection was six weeks in Apollo speciality hospital at Madurai. Initially the investigator established rapport with the study subjects. The purpose of the study was explained and received their consent to collect the data day. Seven staff nurses were assessed the interview schedule, the data was collected from staff nurses. The interview last for 40 minutes for each sample. Self -Instructional Module has given immediately after pre-test to each sample. It was last for about 40 minutes. Post- test was assessed with an interval of 15 days after self -Instructional module to assess the knowledge regarding placental stem cells utilization by using the same tool. The working period of data collection 8a.m-1p.m and 5p.m-8.00p.m.

### **DATA ANALYSIS:**

Data was analyzed based on the objectives. Frequency and percentage was computed for describing the sample characteristics. Bio statistical methods such as frequency, percentage, were used to find out the pre- test and post- test knowledge score. Paired t-test was computed to find out the effectiveness of Self Instructional Module. Chi-square test was computed to describe the association between post-test knowledge score of the sample and demographic variables.

## **MAJOR FINDINGS OF THE STUDY:**

- ❖ Majority of the samples were in the age group of 22-25 years 62(62%).
- ❖ Majority of the samples were females 90 (90%)
- ❖ Majority of the samples were Christians 52 (52%)
- ❖ Majority of the samples were un-married 63 (63%)
- ❖ Majority of the samples belongs to nuclear family 76 (76%)
- ❖ Majority of the samples belongs to living in Urban 56(56%)
- ❖ Majority of the samples were belongs to GNM 38 (38%)
- ❖ Majority of the samples had completed in Govt. School of nursing 39 (39%)
- ❖ Majority of the samples had previous work experience in neonatal ward 37 (37%)
- ❖ Majority of the samples belongs to 1-5 years of experience 72 (72%)
- ❖ Majority of the samples had availability of educational programme 35 (35%) In- service education
- ❖ Majority of the samples had the sources of knowledge regarding placental stem cells utilization got information from stem cells banks- Newsletters 43 (43%)

- ❖ The pre-test score reveals that 54 (54%) nurses had inadequate knowledge, 45 (45%) had moderately adequate knowledge, 1 (1%) had adequate knowledge regarding placental stem cells utilization.
- ❖ The post-test score 33 (33%) nurses had adequate knowledge, 67(67%) had moderately adequate knowledge, and none of them had inadequate knowledge regarding placental stem cells utilization.
- ❖ The mean posttest knowledge score of the subjects 28.00 is higher than the mean pre-test knowledge score 16.00. The calculated 't' value 35.178 is greater than of table value (1.984) at 0.05 level of significance. Which indicates that Self Instructional Module is effective in gaining in subjects knowledge regarding placental stem cells utilization.
- ❖ Chi-square was computed to find out the association between mean post- test knowledge score and demographic variables. The result shows there is a significant association between area of residence, professional qualification, institution studied, previous work experience, Availability of educational programme, source of knowledge about placental stem cells utilization. Other demographic characteristics did not show association with knowledge regarding placental stem cells utilization.

## **NURSING IMPLICATIONS**

### **NURSING PRACTICE**

- ❖ Nursing personnel should plan to implement and evaluate various teaching programme regarding placental stem cells utilization.
- ❖ The self-instructional module should be used as, a tool to impart knowledge for the nursing personnel in hospital and community.
- ❖ Nurses should supervise the nursing student when applying the placental stem cells utilization therapy in their practice.
- ❖ Nurses should play a pivotal role in managing chronic ill patients both in the hospital as well as in the community setting.

### **NURSING EDUCATION**

- ❖ The nurse educator should arrange In-service education programme for the nurses who are all working in maternity hospitals to update the knowledge regarding placental stem cells utilization, there by they can effectively supervise the training nurses and nursing students while giving placental stem cells utilization therapy for cancerous diseases.
- ❖ The concept of placental stem cells utilization can be included in basic nursing education curriculum which makes the student nurse more competent and motivate them to prevent malignant non-malignant diseases.

- ❖ Nurse educator should plan and conduct short term continuing education, workshop, for nurses working in hospital and community set up to improve learning experience in placental stem cells utilization.
- ❖ Nursing education should prepare nurses with the potential for imparting health information effectively and assisting the student nurses with placental stem cells utilization.
- ❖ Audio visual aid like LCD will serve as a teaching aid for self-learning or group learning among nurses.

### **NURSING ADMINISTRATION**

- ❖ The nursing administrator should arrange for conference and continuing education programme, for nursing personnel regarding placental stem cells utilization.
- ❖ Pamphlets, handouts, charts, posters and booklets should be kept in hospitals regarding placental stem cells utilization.

### **NURSING RESEARCH**

- ❖ The nurse researcher should focus on conducting research to find out the knowledge level of the staff nurses and make use of new methods of teaching, focusing on interest, quality and cost effectiveness.



- ❖ Investigators should conduct further experimental studies regarding this topic.
- ❖ The nurse researcher should publish her study result in the conference, workshop or through other medias, more studies can be conducted in this area in order to strengthen the role of nurse.
- ❖ Research study should be conduct to placental stem cells utilization how effectively used for caring the malignant and non-malignant disorders of the adults and children.
- ❖ The newer methods of impacting health information will be effective if empirically tested.

### **RECOMMENDATIONS FOR FURTHER RESEARCH**

On the basis of present study, following recommendations are made,

- Similar study can be done with large sample.
- A similar study can be conducted to assess the knowledge and attitude among staff nurses.
- A comparative study also can be done to determine the knowledge and practice of placental stem cells utilization among urban and rural hospitals.
- A comparative study can be conducted to assess the knowledge regarding GNM students and B.Sc. Nursing students.
- A similar study can be conducted in the community area among nurses in the primary health centre.

## **CONCLUSION**

Self- Instructional Module on placental stem cells utilization was effective in improving adequate and moderately adequate knowledge. So awareness programme could be organized related to current status in health. Periodically nurses need to be motivated to attend more conferences, workshops, and continuing education programme to get updated.

## REFERENCES

- ❖ Armson B. (2005). Umbilical cord blood banking: implications for Perinatal care providers. JOGC March 156:263-74.
- ❖ Benito AI, Diaz MA. (2004). Hematopoietic stem cell transplantation using placental cord blood progenitors: review of current clinical results. Bone Marrow Transplant, April; 33(7):675-90.
- ❖ Bhattacharya N, Mitra R, Mukharjee K L, et., al.(2002).Can human cortical tissue transplant (up to 20weeks) sustain its metabolic and oxygen requirement in patients with parkinsonism. Clini.exp.obstetgynaecol: 29(4).
- ❖ Bhattacharya, N. (2001). A study report of placental and umbilical cord stem cells. Clinical Exp obstet Gynec. 28 (1), 91-95.
- ❖ Bouzas LF, Paragaussu-Braga FH, et., al.A study to evaluate the effectiveness of structured teaching programme on knowledge regarding placental cord blood collection, preservation,and utilization among health professional.
- ❖ Cairo MS, Wagner JE. Placental cord blood: alternative source of hematopoietic stem cells for transplantation. Blood 1997;90(12):4665-78.

- ❖ Chaitanya stem cell therapy center for regenerative Medicine for cerebral palsy treatment, Sep (2011). at Chaitanya Hospital, in India.
- ❖ Chaitanya stem cell therapy center for regenerative Medicine for spinal cord injury treatment sep (2011). at Chaitanya Hospital, in India. [http://www. Chaitanya stem cell.com/spinal cord injury.php](http://www.Chaitanya stem cell.com/spinal cord injury.php).
- ❖ Cord blood banking.[online]. Available from: URL:<http://www.international stem cell services.com>
- ❖ Dello, D.M.(2006, August 6). Amniotic fluid and placental stem cells. Retrieved November 20, 2007. From <http://www.ncbi.gov/pubmed/1714065>.
- ❖ Dutta DC.(2009). Text book of obstetrics including perinatology and contraception. 6<sup>th</sup> ed. Kolkata: New central book agency (p) LTD: P.28-36.
- ❖ Eapen M, Rubinstein P Zhang MJ, et., al.(2007) Outcomes of transplantation of unrelated donor placental cord blood and bone marrow in children with leukaemia. Jan 9:369(9577):1947-54.
- ❖ Elizebeth L.(2005). A Study to assess the knowledge and attitude of various health professionals regarding placental stem cells and its utilization. [http://www Chaitanystemcell.com/cerebrapalsy.php](http://www.Chaitanystemcell.com/cerebrapalsy.php).
- ❖ Huang HI.(2005). Isolation of multipotent cells from human term placenta. National health research Institute. 23(1) Retrieved

November 10,2009, from [http://www. Placental stem cells.nlm.gov](http://www.Placentalstemcells.nlm.gov).

- ❖ Hurley CK, Wagner JE, Setterholm MI et., al Advances in HLA: (2006).practical implications for selecting adult donors and cord blood units. BiolBlood Bone Marrow Transplant.12:28-33.
- ❖ Jennifer D, Paul R, Stephen K (2007). Placental cord Blood Research: current and Future Perspectives Cell Transplant. 16(2):151-8.
- ❖ Journal of stem cells and Regenerative Medicine, Article Source: stem cell for cancer posted by July 31, 2011 by,
- ❖ Journal of stem cells and Regenerative Medicine, Chaitanya stem cell center, 174,121.38 157/chaitany/site map.ph.
- ❖ Juby Rose Kuriakose, The Official Journal of Trained Nurse association of India, The first Journal of nursing from Kerala, Vol 6, No: 3 – September 2011.
- ❖ KorblingM,Katz A. Khanna A. (2002).Treatment of leprosy patients with anaemia by placental cord whole blood transfusion N England Journal of Medicine Jan;346:738-46.
- ❖ Kurtzberg J, Laughlin M, Graham ML. Placental blood as a source of hematopoietic stem cells for transplantation into unrelated recipients. N Engl J Med 1996;335:157-66.

- ❖ Lalitha M. cord blood banking. *Nightingale nursing Times* 2008 Feb;3(11):39-40.
- ❖ Li CK, Shing MM, Chik KW et., al. (2004). Unrelated umbilical cord blood transplantation in children. *Hongkong Med J.* April;10(2):89-95.
- ❖ Liu K, Jiang Y ,Dong W. (2003 ).Collection, Processing and cryopreservation of placental cord blood hematopoietic stem cells. *Beij J Hematology journal*, Apr 18;35(2):119-22.
- ❖ Lowdermilk DL, Perry SE. ( 2007). *Maternity and Women's health care.* 9<sup>th</sup> ed. Philadelphia: Mosby Elsevier.
- ❖ Kumaraswamy S, Muthulakshmi P. Umbilical cord stem cell collection, preservation, and utilization. *Nightingale Nursing Times* (2010 ).Apr;6:16-17.
- ❖ Lysterly A, Sugarman J.et., al (2005 ).‘Untying the Gordian knot: policies, practices and ethical issues related to banking of umbilical cord blood’*JClinInvest* October 1;115(10):2592-97.
- ❖ Malar J (2006).A preliminary study to placental cord blood transplantation under resource person with malaria in background of anaemia. *March*:23:5:20.
- ❖ Mankikar SD, (2010). A new paradigam in medical Therapeutics, *J Long Term Eff Med Implants.*20(3):219-50.

- ❖ Matikainen T. (2005). Placental stem cell therapy Helsinki University central hospital. 207 (2), Retrieved October 15, 2009, from [http, // www. Placental stem cell therapy.nlm.gov](http://www.Placentalstemcelltherapy.nlm.gov).
- ❖ Miao Z.(2006). Isolation of mesenchymal stem cells from human placenta. Three peoples Hospital.30(9) Retrieved May 2009,from [http . //www.nicb. nlm](http://www.nicb.nlm)
- ❖ Mishan K.(2004). Amniotic fluid and placental stem cells.Best practice and research clinical obstetrics and gynaecology,18(6):283-293.
- ❖ Motta JPR, Gomes BE, Bouzas LF et., al Evaluations of bioantioxidants in cryopreservation of placental cord blood using natural cryoprotectants and low concentrations of dimethylsulphoxide. Journal of paediatric nursing.
- ❖ Ordemann R, Petzold K, Holig K et ,.al .(2000 ). Experience of cord blood bank Dresden. J Obstetric and Gynaecological Nov24;125(47):1424-48.
- ❖ Parolini O. (2008). Isolation and characterization of cells from human term placenta. Institute of ospedaliero. 26(1), Retrieved July 25, 2009, from [http. // www.nicb.nlm.gov](http://www.nicb.nlm.gov).

- ❖ Placental cord blood stem cells and cardiovascular diseases[online](2008) feb20; Available from <http://www.medicalnewstoday.com/articles/97995.php>
- ❖ Sadanand, (2010). A new paradigm in medical Therapeutics, J Long Term Eff Med Implants.20(3):219-50.
- ❖ Sauter C, Barker JN. Unrelated donor umbilical cord transplantation for the treatment of hematological malignancies.
- ❖ Science daily.(2009, June 23). Placenta: new source for harvesting stem cells. Retrieved may 29, 2011, from
- ❖ Shini S.(2011).A Study to assess the effectiveness of self-instructional module on knowledge regarding placental stem cells utilization and banking among staff nurses .
- ❖ Smith FO, Kurtzberg, et.,al(1998 ).Umbilical cord blood collection, storage, and transplantation: issues and recommendations for parents and patients. South Med J,91(9):821-8.
- ❖ Tsai M S, Hwang S M, et., al (2006). Clonal amniotic fluid derived stem cell express characteristic of mesenchymal and neural stem cell. Biolreprod. March:749(3):545-51.
- ❖ Usha M, (2010),A quasi experimental study to evaluate the effectiveness of STP on knowledge and attitude regarding utilization of placental stem cells among nurses in Christian mission hospital at Madurai.



- ❖ Wong A, Yuen P.M, Li K, et., al (2001 ).cord blood collection before and after placental delivery: levels of nucleated cells hematopoietic progenitor cells, leukocyte subpopulations and macroscopic clots. Bone Marrow transplantation January;27(2):133-138.

**NET REFERENCES :**

[www.pubmed.com](http://www.pubmed.com)

[www.google.com](http://www.google.com)

[www.medline.com](http://www.medline.com)

[www.medscape.com](http://www.medscape.com)

[www.Emedicine.com](http://www.Emedicine.com)

## APPENDIX – I

### LETTER SEEKING EXPERTS OPINION FOR CONTENT VALIDITY OF THE TOOL

From:

Mrs.sudha K.N.,  
M.Sc Nursing II year,  
Matha College of Nursing, Manamadurai.

To:

**Through:** The Principal, Matha College of Nursing Manamadurai.

**Respected Madam,**

**Sub:** Requisition of expert opinion and suggestion for content validity of the tool.

I am the second year Master degree student in Matha College of Nursing ,Manamadurai. In Partial fulfillment of master Degree in Nursing , I have selected the topic mentioned below for the research project to be submitted to the Dr. MGR Medical University , Chennai.

**Problem Statement :**

**“A study to assess the effectiveness of self- instructional module on placental stem cells utilization among staff nurses at selected hospitals in Madurai, Tamilnadu”.**

I request you to validate the tool and give your expert opinion for necessary Modification and also I will be very grateful if you refine the problem statement and objectives.

Thanking you with anticipation

**Research Tool :**

Demographic Variables  
Knowledge questionnaire placental stem cells utilization

Place: Manamadurai

yours faithfully,

Date:

## **APPENDIX-II**

### **LIST OF EXPERTS OPINION FOR CONTENT VALIDITY RESEACH TOOL**

**1. Dr.( Mrs.)T.LAKSHMI DEVI, MD, DGO,**

Assistant surgeon,  
obstetrician and gynaecologist,  
Government hospital, sivagangai.

**2. Prof. Mrs. Merlin M.Sc., (N)**

Vice principal cum HOD of OBG Nursing,  
CSIJeyarajAnnapackiyamCollege of Nursing,  
Pasumalai ,Madurai.

**3. Prof. Mrs. ThamaraiSelvi, M.Sc(N),,**

Administrative Vice Principal,  
Matha College of Nursing,  
Manamadurai.

**4. Mrs. ReetaJebakumari M.Sc. (N),,**

Associate Professor,  
Sacred HeartNursingCollege,  
Madurai.

**5. Mrs. Arzta Sophia, M.Sc. (N),,**

Reader,  
Department of OBG Nursing,  
Neyyoor.

## **APPENDIX-III**

### **LETTER SEEKING PERMISSION TO CONDUCT STUDY IN APOLLO SPECIALITY HOSPITALS, MADURAI.**

From

Prof. Mrs. Shabera Banu M.sc.,  
Principal,  
Matha College of Nursing,  
Manamadurai.

To

**Respected Sir/Madam**

**Sub:** Requisition for giving permission to conduct the research in your esteemed organization.

I am to state that **Mrs.SudhaK.N.** one of our final year M.Sc., Nursing students has to conduct a project , which is to be partial fulfillment of university requirement for the degree of Master of Science in Nursing .

The topic of research is **“A study to assess the effectiveness of self -instructional module on placental stem cells utilization among staff nurses at selected hospitals in Madurai, Tamilnadu”**.

Kindly permit her to do the research work in your hospital.

Thanking you

yours faithfully,

Place:

Date :

**Principal**

**Prof . SHABERA BANU M.sc., (N)**

## **APPENDIX-IV**

### **TOOL**

#### **SECTION -A**

#### **DEMOGRAPHIC DATA OF NURSES**

The questionnaire consists of items related to the demographic variables kindly put a tick mark [ ] for the most appropriate answer.

##### **1. AGE**

- a) 22 – 25 years [ ]
- b) 26 – 30 years [ ]
- c) Above 31 years [ ]

##### **2. SEX**

- a) Male [ ]
- b) Female [ ]

##### **3. RELIGION**

- a) Hindu [ ]
- b) Christian [ ]
- c) Muslim [ ]

##### **4. MARITAL STATUS**

- a) Married [ ]
- b) Un – Married [ ]

## 5. TYPE OF FAMILY

- a)Nuclear [    ]
- b)Joint [    ]

## 6. AREA OF RESIDENCE

- a)Urban [    ]
- b) Rural [    ]

## 7.PROFESSIONAL QUALIFICATION

- a)GNM [    ]
- b)B.Sc.Nursing [    ]
- c)Pc.B.Sc Nursing [    ]

## 8. INSTITUTION STUDIED

- a)Government college/school [    ]
- b)Non government college/School [    ]
- c)Deemed university college [    ]

## 9.PREVIOUS WORK EXPERIENCE

- a)Maternity ward [    ]
- b)Neonatal ward [    ]
- c)Medical ward [    ]
- d)Surgical ward [    ]

10. YEARS OF EXPERIENCE

- a) 1 – 5 years [    ]
- b) 6 – 10 years [    ]
- c) 11 – 15 years [    ]
- d) More than 15 years [    ]

11.AVAILABILITY OF EDUCATIONAL PROGRAMME

IN THE HOSPITAL

- a) Continuing Education [    ]
- b) In – service Education [    ]
- c) Work shop [    ]
- d) Conference [    ]

12.SOURCES OF KNOWLEDGE ABOUT PLACENTAL

STEM CELLS UTILIZATION

- a) Electronic media [    ]
- b) Print media [    ]
- c)Stem cells banks(News letters/pamphlets) [    ]
- d)Friends and relatives [    ]
- e)Health professionals [    ]

## SECTION B

### STRUCTURED QUESTIONNAIRE ON KNOWLEDGE REGARDING PLACENTAL STEM CELLS UTILIZATION

#### CELLS:

The questionnaire consists of **33** multiple choice questions regarding knowledge on placental stem cells utilization, for each correct answer the score is '1' for the wrong answer the score is '0' the maximum score for the knowledge on placental stem cells utilization is **33**.

#### INSTRUCTION:-

Following questions will be asked about the knowledge on placental stem cells utilization. Please give response to the questions. Tick the appropriate answer in the box provided.

1. What are stem cells?

- a) Building blocks of the blood and immune System and precursors of various tissues and cells. [    ]
- b) Immature cells of no use [    ]
- c) Mature cells of no use [    ]

2. Where do stem cells come from?

- a) Lungs [    ]
- b) Mammary gland [    ]
- c) Human embryo [    ]



3. What are the types of stem cells?

- a) Progenitor, stromal cells [    ]
- b) Autologous, Homologous [    ]
- c) Pluripotent, and multipotent [    ]

4. Stem cells have the capacity of developing in to.

- a) Red blood cells [    ]
- b) Any kind of tissue [    ]
- c) White blood cells [    ]

5. Sources of stem cells include the following EXCEPT?

- a) Bone marrow [    ]
- b) Embryonic cells [    ]
- c) Liver cells. [    ]

6. Which of the following blood components is not a derivative of stem cells?

- a) White blood cells [    ]
- b) Plasma [    ]
- c) Platelets [    ]

7. What is the effect of harvesting placental stem cells?

- a) No harm to the mother [    ]
- b) No harm to the mother and embryo [    ]
- c) No harm to an embryo [    ]

8. What makes embryonic stem cells different from other stem cells?

- a) To form foetal liver and bone marrow [    ]
- b) To form blood and immune system of the foetus [    ]
- c) To make all of the different tissue of the body [    ]

9. What is the unique character of stem cells?

- a) Emerging from RBC, WBC, Platelets [    ]
- b) No emerging from RBC, WBC, Platelets [    ]
- c) Transferring the cells [    ]

10. Why Placental stem cells transplantation is better than bone marrow transplants because of

- a) Easy availability [    ]
- b) High rate of development of new tissues [    ]
- c) Easy storage facility [    ]

11. The indication of placental stem cells utilization

- a) Chronic kidney disease [    ]
- b) Sickle cell anaemia [    ]
- c) Malarial disease [    ]

12. The indication of placental stem cells utilization

For non cancerous disease is

- a) Spinal cord injury [    ]
- b) Pelvic injury [    ]
- c) Head injury [    ]

13. What does auto logoustransplantation mean?

- a) Monozygotic twin's stem cells are used [    ]
- b) Dizygotic twin's stem cells are used [    ]
- c) Patients own stem cells are used transplant [    ]

14. Auto logousstem cells transplantation, a procedure in which?

- a) A patient is treated with high-dose chemotherapy followed by an infusion of his or her own stem cells [    ]
- b) A patient is treated with high -dose chemotherapy only [    ]
- c) A patient is treated with infusion of his or her own Cells only [    ]

15. What are the side effects of stem cells transplantation?

- a) Infection [    ]
- b) Weight reduction [    ]
- c) Teratomas [    ]

16. What is the contraindication of collecting placental stem cells?
- a) Mother with single fetus [    ]
  - b) Mother with forceps delivery [    ]
  - c) Mother with HIV [    ]
17. What is time duration for finishing the placental blood collection procedure?
- a) Within 10 minutes. [    ]
  - b) Within 30 minutes. [    ]
  - c) With in 1 hour [    ]
18. How soon does the collected specimen should reach the lab?
- a) Within 12 hours [    ]
  - b) Within 24 hours [    ]
  - c) Within 36 hours [    ]
19. What does the perfusion circuit contains
- a) Heat exchange unit [    ]
  - b) Cold exchange unit [    ]
  - c) Perfusion unreservoir [    ]

20. The placenta was first perfused with what?

- a) 57% PBS with penicillin 100 units/ml [    ]
- b) Phosphate buffered saline (PBS) [    ]
- c) Alfa-MEM medium containing [    ]

21. Which medium used for the long term perfusion ?

- a) 200-400ml Alpha MEM medium containing bovine [    ]
- b) 600-700ml Alpha MEM medium containing bovine [    ]
- c) 500-1000ml Alpha MEM medium containing bovine [    ]

22. What temperature the Placenta should be placed in to freezer for long-term storage?

- a) -60<sup>0</sup>c freezer for 12 hours [    ]
- b) -70<sup>0</sup>c freezer for 12 hours [    ]
- c) -80<sup>0</sup>c freezer for 12 hours [    ]

23. How collected placental blood stem cells will be preserved?

- a) Stored in cryovials [    ]
- b) stored in test tubes [    ]
- c) stored in plastic bags [    ]

24. How many are days needed for culture in "Methocult media"

for placenta

a) 10 days [ ]

b) 14 days [ ]

c) 20 days [ ]

25. What is the use of stem cells transplantation?

a) Treat lower respiratory tract infection [ ]

b) Treat cancerous disease [ ]

c) Treat communicable disease [ ]

26. What is the perfect match probability rate of baby's stem

cells with his /her sibling?

a) 25% [ ]

b) 50% [ ]

c) 75% [ ]

27. What does donor match means?

a) Host will not reject the donor's stem cells [ ]

b) Will reject [ ]

c) Will compatible [ ]

28. What is therapeutic cloning?

- a) Cloning used in conservative treatment. [    ]
- b) Cloning used in clinical treatment. [    ]
- c) Cloning used in community treatment. [    ]

29. What is the most important role of nurse in collecting placental stem cells?

- a) Getting consent from the donor. [    ]
- b) Maintaining confidentiality. [    ]
- c) Explaining procedure to the donor's family. [    ]

30. When will you intimate to the service centre regarding placental stem cells collection?

- a) Between 1 – 6 months of pregnancy [    ]
- b) 3 months of pregnancy [    ]
- c) 8 months of pregnancy [    ]

31. Who is the legal authority for utilization of placental stem cells remains with?

- a) The parents, until the child become major. [    ]
- b) The parents [    ]
- c) Health professionals [    ]

32. Which year the placental stem cells transplantations has been initiate

- a) 1960 [    ]
- b) 1970 [    ]
- c) 1989 [    ]

33. In Tamilnadu which is the center for stem cells transplantation?

- a) CMC, Vellore [    ]
- b) Ramachandra hospital, at Chennai [    ]
- c) K.G. hospital, at Kovai [    ]



## APPENDIX-V

### ANSWER KEYFOR KNOWLEDGE QUESTIONNAIRE

QUESTION NO	ANSWERS
1	A
2	C
3	C
4	B
5	C
6	B
7	B
8	C
9	A
10	B
11	B
12	A
13	C
14	A
15	C
16	C
17	A
18	C
19	A
20	A
21	C
22	C
23	A
24	B
25	B
26	B
27	A
28	B
29	B
30	A
31	A
32	C
33	A

## **APPENDIX – VI**

### **SELF INSTRUCTIONAL MODULE ON PLACENTAL STEM CELLS UTILIZATION**

#### **INTRODUCTION:**

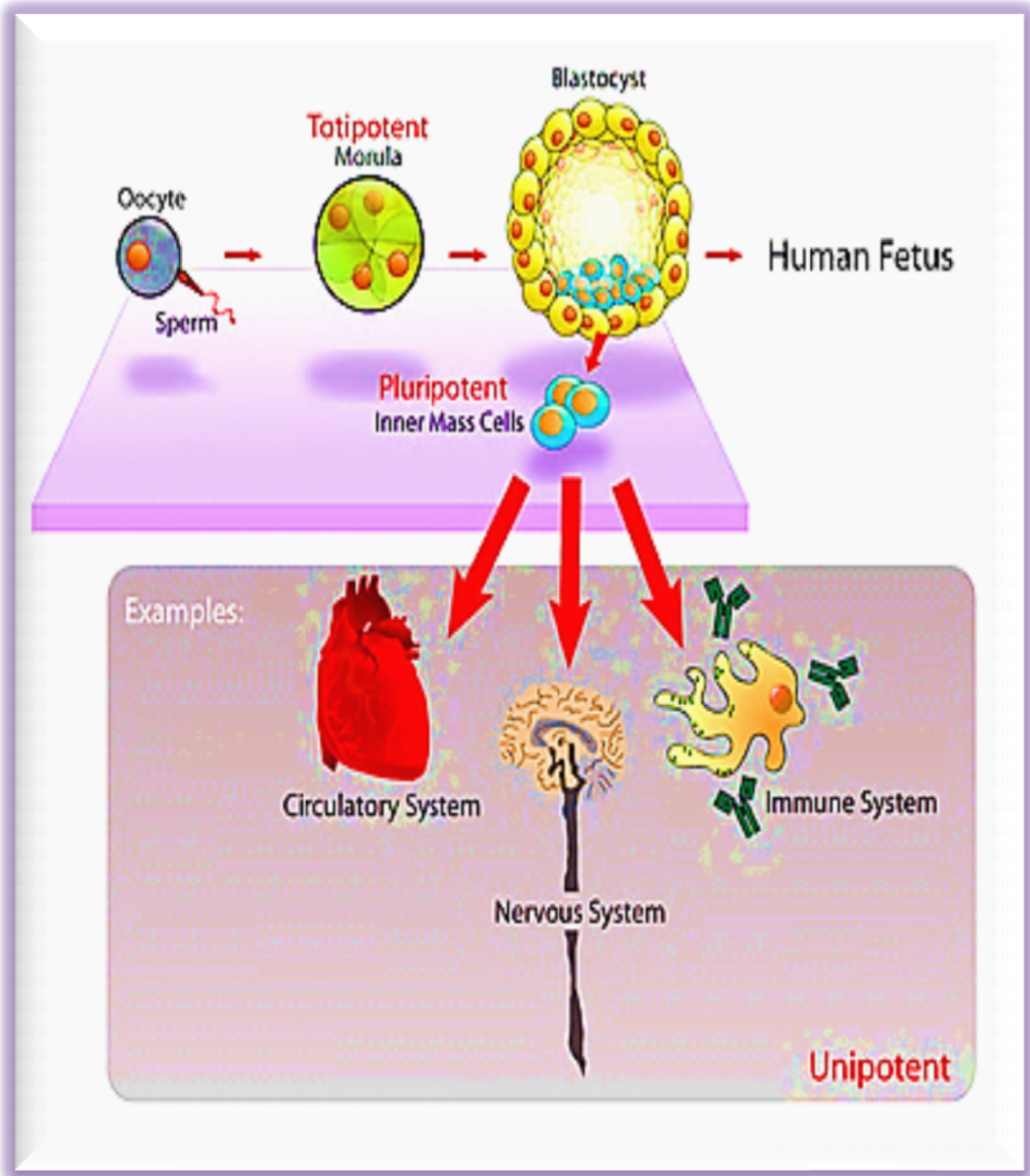
To accomplish great things, we must not only act,

But also dream, not only plan, but also believe.

-Anatole France

Health is the most important aspects of life which needs to be maintained at any time in a person's life at any cost. A topic that has recently raised public concerns- among religious leaders, politicians celebrity spokespersons, and many others is research on embryonic stem cells ,(ESC), primitive cells found in the early embryo that can differentiate in to any adult tissue. Although the great promise of ESC therapy is widely accepted, vociferous debate continues as to ethical validity of ESC harvesting, which presently cannot be done without destroying a potentially viable human embryo. This summary will not attempt to address directly the important ethical issues surrounding ESC research, but rather will outline current understanding of ESC development and progress towards ESC therapy.

# STEM CELLS



Stem cells are the basic building blocks of blood and immune system and precursors of various tissue and cells. They can divide and replenish other cells and give rise to number of tissues which constitute different organs and its should come from human embryo.

### **STEM CELLS:**

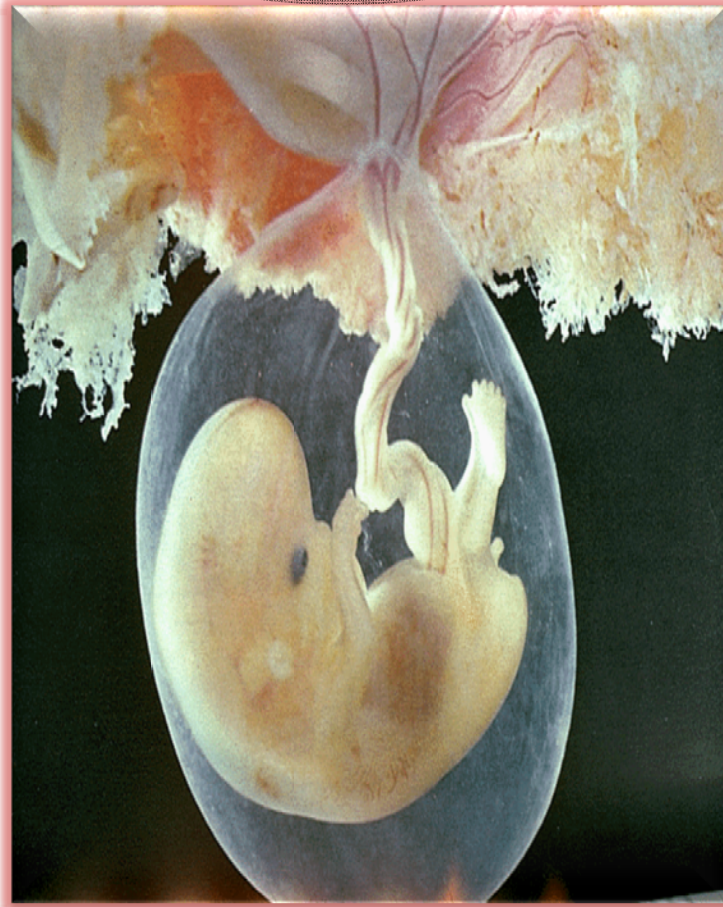
Stem cells are cells that have the potential to develop in to some or many different cell types in the body, depending on whether they are multipotent or Pluripotent . serving as a sort of repair system. they can theoretically divide without limit to replenish other cells for as long as the person is still alive. When a stem cell divides “daughter” cell has the potential to either remain a stem cell or become another type of cell with a more specialized function, such as a muscle cells, a red blood cell or a brain cell and stem cells have the capacity of developing in to any kind of tissues.

### **SOURCES OF STEM CELLS:**

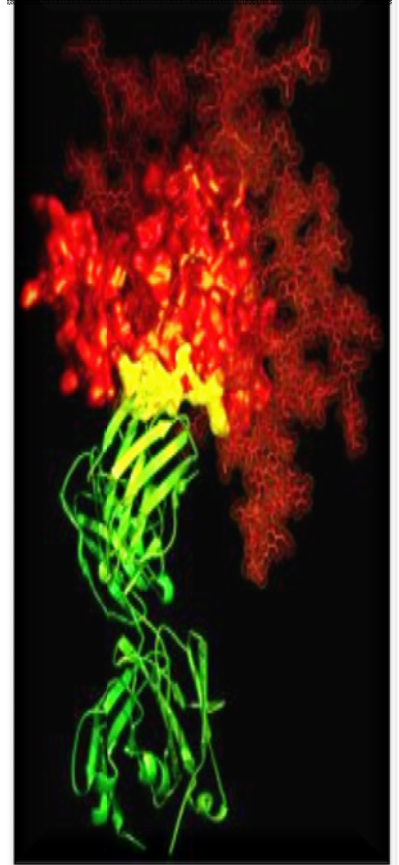
The sources of stem cells include bone marrow, peripheral blood, placenta or umbilical cord, human embryonic stem cells but except in the liver cells.

## SOURCES OF STEM CELLS

**HUMAN  
EMBRYONIC STEM  
CELLS**

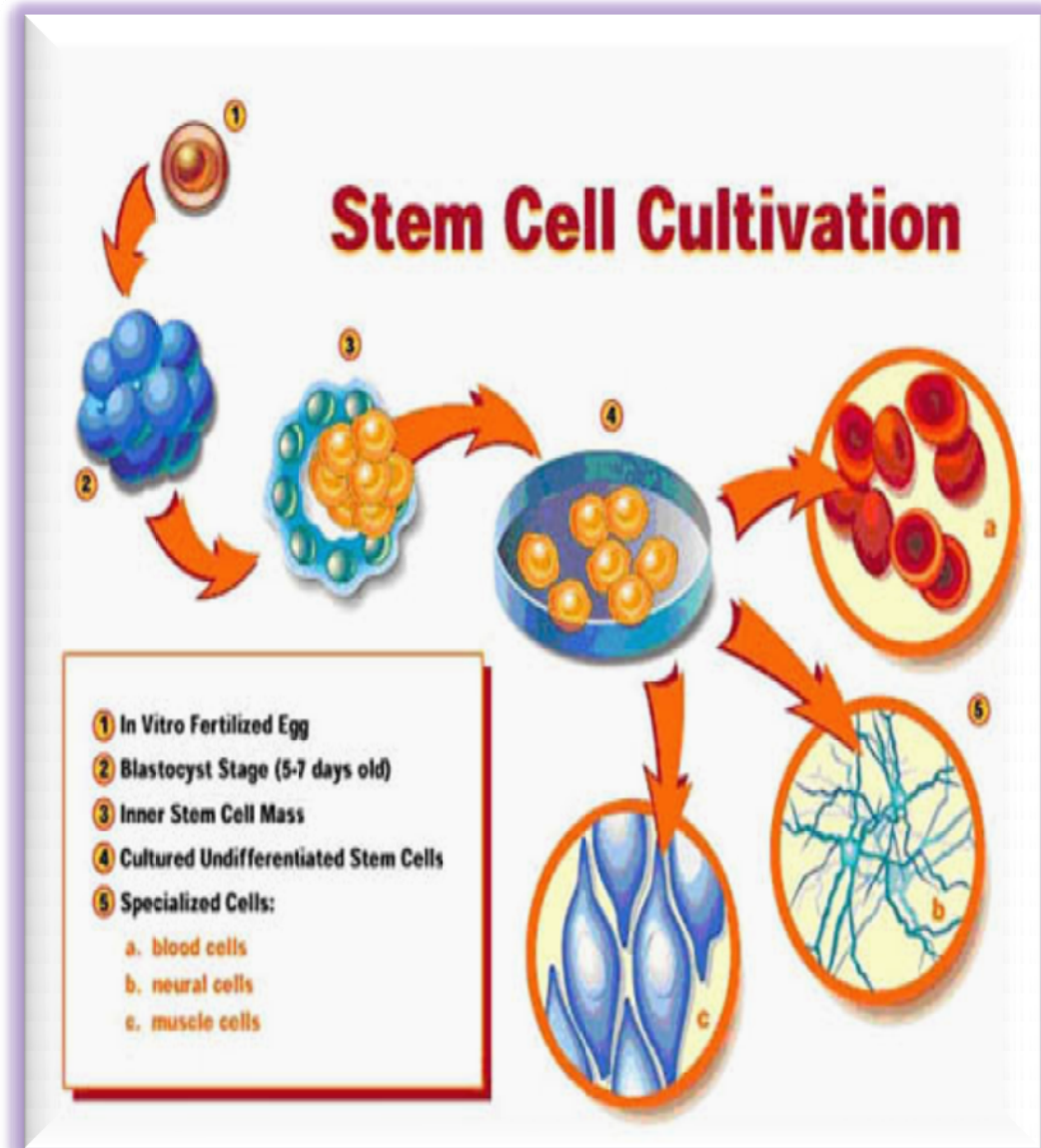


**BONE MARROW  
STEM CELLS**



## UNIQUE CHARACTER OF STEM CELLS:

The unique character of stem cells emerging from red blood cells, white blood cells and platelets but not transferring the cells. Stem cells potential to be harvested from patients and ability to integrate in to host tissue, and which is blood component contains of more stem cells.



## **ADVANDAGES OF PLACENTAL STEM CELLS:**

Placental blood stem cells are the major sources of hematopoietic stem cells and mostly used to regenerate a patient's blood and immune system that have been weakened or damaged by radiation or chemotherapy.

Placental blood stem cells are now used as an alternative to bone marrow transplant, but placental blood stem cells transplantation is better than bone marrow transplants because of its high rate of engraftment (develop in to new tissue or organ). The effect of harvesting placental stem cells is no harm to mother and embryo.\

- Placental blood is a rich and non controversial sources of stem cells
- To make all of the different tissues of the body
- To collection procedure is safe
- No risk or discomfort to mother and baby
- Less risk of viral infection
- It causes less transplant rejection
- It has higher concentration and greater capacity to proliferate
- High rate of development of new tissues than bone marrow transplantation

## **DEMERITS OF BONE MARROW TRANSPLANTATION:**

- Average length of time for searching the donor to procurement of bone marrow cells and treatment (135 days).
- Cost for donor and harvesting Rs 11,75,000 to Rs23,50,000 (\$25000 to \$50000)
- Low availability of human leukocyte antigen matched donor with bone marrow.

## **INDICATIONS OF PLACENTAL STEM CELLS UTILIZATION :**

- ❖ Multiple sclerosis
- ❖ Crohn's disease
- ❖ Rheumatoid arthritis
- ❖ Spinal cord injury
- ❖ Heart tissue regeneration
- ❖ Parkinson's disease
- ❖ Diabetes mellitus
- ❖ Thalassemia
- ❖ Sickle cell anaemia
- ❖ Anaemias
- ❖ Immunodeficiencies

## **AUTO- LOGOUS STEM CELLS TRANSPLANTATION:**

Auto logous transplantation means patients own stem cells are used to transplant and a procedure in which a patient is treated with high-dose chemotherapy followed by an infusion of his/her own stem cells.



## **SIDE EFFECTS OF THE PLACENTAL STEM CELLS TRANSPLANTATION:**

These are issues that have to be considered as a person undergoes stem cell therapy. An obvious concern is the development of unwanted tissue types in the region undergoing treatment. For example, we would not want bone to be formed in the liver if the goal was to regenerate the liver. Rejection is another concern even though current clinical practice ensures a match between donor and host. Some adult stem cells appear to be resistant to rejection. These adult stem cells are seriously considered for treatment. The formation of cancer cells (teratomas) from embryonic stem cells is another major potential side effect of any embryonic stem cell-based therapy.

## **PLACENTAL BLOOD COLLECTION:**

The distinct populations of placental cells were obtained from the placentas of normal full term pregnancies or undergoing elective caesarean section. All donors provided full written consent for the use of their placentas for research purpose. The contraindication of collecting placental stem cells mother with HIV. The placental stem cells were obtained from the following sources:

- ❖ Placental perfusate from perfusion of the placental vasculature
- ❖ Amnion
- ❖ Chorion
- ❖ Amnion-chorion plate
- ❖ Umbilical cord

## **PREREQUISITE FOR PLACENTAL BLOOD COLLECTION:**

- ❖ Parents are requested to sign an informed consent
- ❖ Sampling the mother's blood for infectious disease

## **PROCEDURE**

### **PLACENTA PERFUSION AND CRYOSTORAGE:**

The time duration taken to finish the placental blood collection procedure within 10 minutes and collected the specimen should reach the lab within 36 hours. After the placentas were rinsed from the outside with saline and infused with 30ml of an anticoagulant/vasodilator solution (Heparin 30U/ml, Papaverin hydrochloride, 1mg/ml) at room temperature. The arteries and vein of the umbilical cord were subsequently cannulated, and connected to a perfusion circuit, containing a heat exchange unit, roller pump and perfusion reservoir. Constant temperature of the perfusate was maintained, perfusion procedures were performed similarly as described by us before. And the placentas were first perfused with phosphate buffered saline (PBS) to remove UCB remaining in the placental tissue. Long-term perfusion (6 hours) were performed with 500-1000 ml of alpha-MEM medium containing 5% bovine serum albumin, 10U/ml heparin and 0.1 mg/ml. Papaverin hydrochloride.

### **CRYOPRESERVATION:**

Placentas were perfused with a mixture of 15% propylene glycol, 14% DMSO, 14% Formamide, and 57% PBS with penicillin 100U/ml/streptomycin 100microgram/ml/Fungisone 0.25 microgram/ml

(PSF). The arterial and venous line were then closed, placentas were placed into a -80°C freezer for 12 hours, and subsequently placed into liquid nitrogen vapor at -190°C for long-term storage and collected placental stem cells will be preserved and stored in cryovials.

### **IMMUNOSTAINING:**

Tissues were fixed with 4% paraformaldehyde, paraffin-fixed and cut, deparaffinized in xylenes, rehydrated in alcohols, permeabilized with cold Methanol (-20°C) and 1% Triton X-100 for 5 minutes. Slides were incubated with blocking buffer (3%BSA in 4x SCC, 2% goat serum, 3%FCS, 0.1% Tween 20) for 60 minutes at 37°C and incubated with primary antibody (1:10-100 dilution) overnight at 4°C. Slices were washed. incubated with blocking solution for 20 minutes and then incubated with secondary antibody (1:500) labeled with FITC – or Alexa Fluor-633 for 60 minutes at 37°C, washed, and mounted on slides with Gold Antifade reagent (Molecular probes, Eugene).

### **PLACENTAL CELLS ISOLATION:**

Cells were isolated from placental tissue by either enzyme digestion or perfusion with AMD 3100. Portions of the perfused and washed placenta were infused with 50ml PSF containing 2.5U/ml Dispase. Trypsin (0.5 mg/ml for 20 minutes at 37°C, and tissue samples were digested with 0.1% collagenaseI, and 2.5U/ml Dispase.

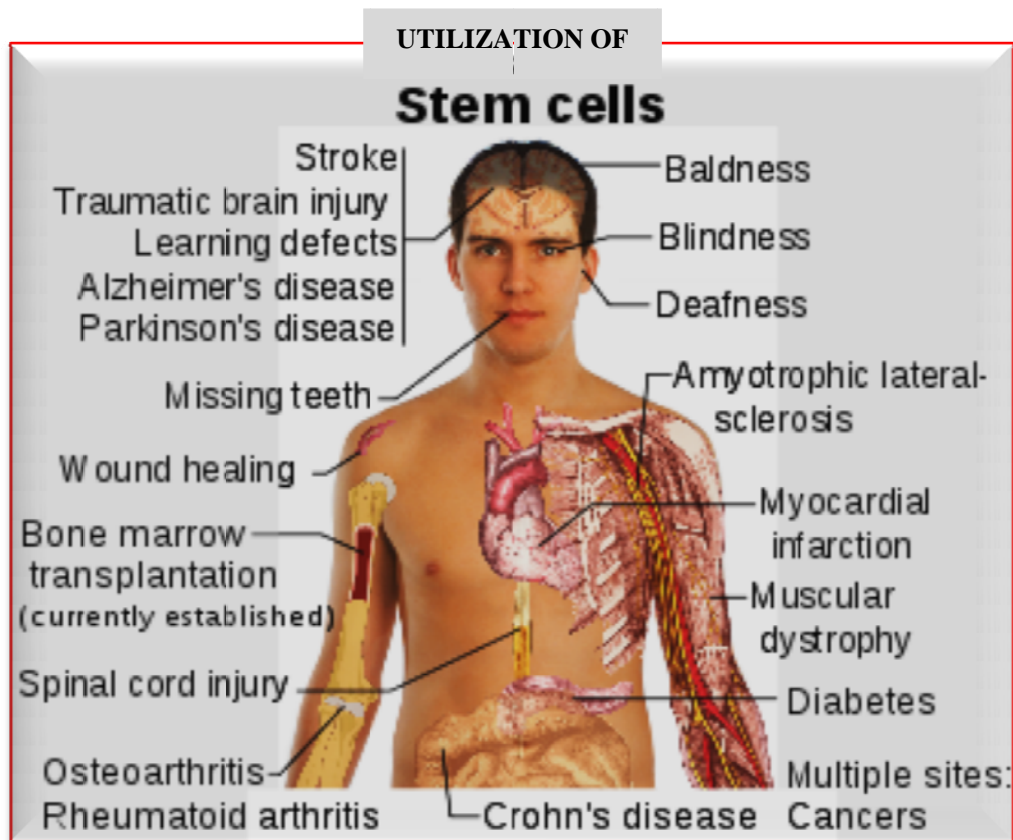
## **HEMATOPOIETIC DIFFERENTIATION ASSAYS**

Colonies of cells were scored for CFU-E, BFU-E, CFU-GM, and CFU-GEMM after incubation for 2 weeks with complete Metho cult (Methylcellulose- based media). The 14 days needed for culture in “Methocult media” for placenta.

## **PLACENTAL STEM CELLS UTILIZATION:**

Placental stem cells transplantation has been used to treat more than 75 cancerous and non cancerous diseases like,

- Cancer (Leukemia, Myeloma, Lymphoma)
- Blood disorders (Anaemia, Aplastic anaemia, Thalassemia, sickle cell anaemia)
- Immuno deficiencies (severe combined immuno deficiency, chronic granulomatous disease)
- Inborn errors of metabolism (Adrenoleuko dystrophy, osteopetrosis)
- Auto immune disorders (Rheumatoid arthritis, systemic lupus erythematosus)
- Musculo skeletal connective tissue disorders



### **ELIGIBLE PERSONS FOR PLACENTAL STEM CELLS UTILIZATION:**

The 50% of perfect match probability rate of baby's stem cells with his/her siblings, parents, or cousins if have adequate human leukocyte antigen (HLA) match. The donor match means host will not reject the donor's stem cells.

### **CLONING:**

Cloning is a procedure where the genetic material (DNA) of an individual is taken from an adult stem cell (for example, a skin cell) and then transferred in to an oocyte (an egg). Before the adult cell DNA is placed in to the egg. The scientist removes the egg's existing DNA, thus

after the adult DNA is transferred in to the egg, the new egg has the DNA of the skin cell.

Therapeutic cloning is the same as cloning, except that it is designed only for the purpose of clinical treatment for example if a patient has liver damage. It is theoretically possible to manipulate the environment in which a cloned cell is growing so that it becomes a liver cell. If the cells are allowed to replicate, They can then regenerate the liver.

### **NURSES RESPONSIBILITY:**

The most important role of nurse in collecting placental stem cells are maintaining confidentiality. Other responsibility such as

- ❖ Getting consent from the donor
- ❖ Explaining the procedure to the patient
- ❖ The nurse should intimate to the service centre regarding placental stem cells collection between 1-6 months of pregnancy.
- ❖ The parents, until the child become major remains as legal authority for placental stem cells utilization
- ❖ Proper maintenance of records

### **STEM CELLS TRANSPLANTATION CENTRE:**

The placental stem cells transplantation has been initiated in the year of 1989. The stem cell transplantation (SCT) is a life saving procedure for a number of malignant and non- malignant life threatening diseases.

More than 40,000 SCTs are being performed till now is around 500. The procedure itself has many technical variations according to the primary disease, age of the patient, facilities available, and experience of the centre in India.

**The larger transplant centre are:**

- Tata memorial hospital, Mumbai
- Christian Medical college, vellore
- AIIMS, New Delhi
- Apollo cancer hospital, Chennai
- Army hospital R and R , New Delhi
- SGPGI, Lucknow
- Cancer Institute (WIA), Chennai
- **Some of the other hospitals which have also started the procedure or are in the process of establishing the facility are:**
- Apollo hospital, Hyderabad
- Rajiv Gandhi cancer Institute, New Delhi
- Command hospital (sc), Pune
- Cancer care trust hospital, Indore
- PGIMER, Chandigarh

The cost varies from Rs 6 to 15 lacs procedure. The majority of patients who have undergone SCT will lead productive lives in their own towns and any complication will have to be managed initially by the local physicians.

## **CONCLUSION:**

Here we are with a dream to build hopes,

To fulfill vision to realize and a future to construct.

-O.E. Bevis

The facilities for stem cell transplantation in India are increasing, but awareness of its optimal utilization needs to be improved. The procedure is expensive as a lot of resources are required in the form of supportive therapy. Nevertheless, for those who survive for two years after an allogeneic transplant, the 5 years survival is 89%. In terms of cost effectiveness, a SCT performed early is more beneficial than conventional treatment with eventually fatal results. The indications, benefits and potential complications must be known by all the nurses.