INTRODUCTION
CHAPTER - 1

1.1 Introduction

Virtually every part of the developing fetus has higher proliferative capacity. Fetal stem cells are the fetal hemophilic cells which are primarily obtained from bone marrow and liver. These cells have higher amount of telomerase activity and have longer telomerase compared to their adult counterparts. Moreover, these tissues can differentiate efficiently into neuronal, muscle and osteogenic lineages. They can be used for ex vivo gene therapy as well as postnatal bone tissue engineering. Extra fetal tissues are amniotic membranes, placenta, trophoblasts, amniotic fluid cells, all contain progenitor cells. These MSCs can differentiate into most cell ways of mesodermal lineages.

The placenta at term have a diameter of 15-20cm, thickness of 2.5cm at its centre. It feels spongy and weighs about 500gm, weight is roughly 1/6th of the baby weight and occupies 30% of the uterine wall. The fetal layer is protected via easy and glistening amnion with the UC connected at or close to its centre. The placenta is generally connected to the upper a part of the frame of the uterus encroaching to the fundus adjoining to the anterior or posterior wall with identical frequency. Through the decidual spongiosum, a line of separation is made as soon as the baby is delivered. Branches of the umbilical vessels are seen below the amnion as they radiate from the insertion of the cord. The maternal surface is rough and spongy. The blood gives it a dull red color. And also there will be visible of a thin greyish, fairly shaggy layer that is the remnant of the decidua basalis and has come away with the placenta. The maternal surface is mapped out into 15-20 lobes that are confined with the aid of fissures. They are separated be a decidual septal.

UCB is a beneficial assets of stem cells for mesenchymal cells and neural precursor cells. This blood gives yield to keep child's own haemopoietic stem cell for a long term while it's miles keep within the UCB. This CB stem cell may be transplant for the remedy ,while that baby or his or her siblings ever develop a condition like metabolism, immunological, hematological, neurological or cardiovascular illnesses. UCB consists of hemophilic that they
have got more proliferative and colony forming potential and are greater conscious of some increase elements.

**Structure of Placenta**

The predominant clinical use of UCB is for hematological malignancy in children, compared to bone marrow transplant. The benefits of hemophilic transplant are quicker availability, higher tolerance among donor and the recipient, decrease prevalence and severity of graft as opposed to host disorder, low prevalence of viral transmission, lack of donor attrition. The placental and UCB are collected from the ex utero separated placenta.
The collected blood from the UC and the placenta is gathered for the banking and is the stem cells is commonly collect from the reproductive tissues and is the important source of progenitor cells. They have the capacity for use inside the subject of regenerative remedy. A stem cellular has the capability to resume itself for long durations. The source of stem cells are embryonic tissues, fetal tissues, greater fetal tissues, person gonads.

Stem cells are unspecialized and grow as specialized cells. The zygote can give rise to a whole organism, known as totipotent SCs. Stem cell which is type in inner cell mass where it can produce to many different type of cells and are consequently known as pluripotent, can do gene transfer thereafter.
This also reduces the risk of immune rejection. PSCs can further specialized and give rise to cells with more specific functions, known as MSCs. These cells have the potential to become any cells in a specific organ i.e. multipotent. Adult stem cells may have some plasticity and may have the potential to be used in other organs of the body. In the united kingdom, cell cleavage up to 14 days after the fertilization can be used for research. This usually undertaken at 5-6 days, as research occurs on the cells at this stage the embryo does not exist as a 3-d entity and its properties are changed in essence it is to longer an embryo. Stem cell is found in the UC, which can be gathered, have originated in the fetal liver, most stem cell found in the cord are progenitor cells and differentiated further usually into hematopoietic stem cells. These cells may cause transplant issues if used in other people unless there is a close genetic match, such as sibling. The cell could then be used to treat acute lymphoblastic leukemia. The human tissue authority, the Royal college of OBG have produced useful guidance papers to help inform midwifery practice around the tissue of stem cell harvesting and routine commercial UCB collection conducted in the United Kingdom.

The recent advancement in stem cell therapy can advance the medical field through by means of applying latent as this has a power for new cell formation, creation and segregation to various lineages by one's own body.

**Stem cell are classified as**

There are two types:

- SSCs
- ESCs

The originality and efficiency is the regulatory requirements for studies on stem cells. SSCs and this feature can also be generated in order to precipitated PSCs with the aid of rearranging of this cells.

1. SSCs are basically undifferentiated, inhabitant in various parts dedicated to the roots to form the basic structure of the body. And are responsible for the formation of the human being. Studies on SSCs in large part falls beneath the accepted class and may be finished with earlier approval of the institutional committee for stem cellular studies. They have got constrained
plasticity as properly. It can be obtained from one of a kind sources just like the fetus, UC, placenta, little one, baby or person; and from extraordinary parts. This is a completely different in every prospective. This cells especially in some of the organs namely skin, pores, stomach etc go through continuous mitosis and try to be different in their existence. In some parts, it’s found to be very less in number so there needs a lifelong enrichment and growth. Long time cell culture consists of hazards of infection so future genomic modifications can be averted. In addition, way of life medium and unique elements, especially the ones of animal starting, may additionally bring the danger of introducing xenogeneic pathogens and inducing immune reactivity.

2. ESCs are derivative of embryos in advance than separation of trophoectoderm and internal mobile mass are in fact totipotent, equipped of giving rise to the complete organism and in addition embryonic tissues. On the other hand, there form a 3 layers namely endoderm, mesoderm and ectoderm from this cells.

3. PSCs: The fundamental protection unease for recuperation programs are the tumorigenic likely of ESCs and iPSCs.

There are many hemophilic MSCs has been explored for diseases having mesenchymal origin. Intrauterine SCT are being used to correct genetic disorders. It undergo site specific differentiation and contribute to repair tissues in such diseases. There are different ways of treatment from stem cells. One is allogenic transplantation of HSC in the treatment of monogenic disorders has certain advantages. It has high tolerance and less rejection rate as it is done before the onset of fetal immune maturity. Other one is autologous stem cells which is from the fetal cord blood sampling or fetal liver biopsy in early pregnancy. The cell harvested is done with ex vivo gene transfer thereafter. This also reduces the risk of immune rejection.

Fetal HSC in first trimester has favorable engraftment kinetics. In the first trimester fetal hematopoietic stem cell are highly proliferative and they circulate in significant numbers. Therefore these cells are the important source of autologous HSCs. Fetal MSCs can be bioengineered and it may treat the disease of bone, skin, liver and heart. The potential to use the stem cells for the fabrication of tissues or organ implants may prove helpful in the treatment of several diseases like genetic, immuno deficiency syndromes,
urinary incontinence, infertility and structural repairs. Recently the stem cell transplantation, one need to understand its known limitations, putative benefits and the unknown risks. Until there is sufficient evidence on the efficiency of therapy, each case should be considered on an individual basis.

Placental stem cell collection and banking is an known supply of HSCs and MS cellular. That is used for remedy of hematological diseases like leukemia and bone marrow failure. Currently the usage of stem cells in regenerative medication is regulated through institutional regulatory boards. The SC sample is amassed from the UCB and fetal tissues and the banking is achieved in both personal and public centre for stem cell banking.

The utilization of tissue building type treatments to an assortment of ailments as well as wounds has moved from being a fantasy of what may be conceivable later on to the domain of the achievable in the present era. All things being equal, there is still much that should be done, much still to be adapted; in any case, plainly significant advances have been made over the most recent two decades.

A new strategies is probably had to affirm cell quality previous to uses prior to bring out to the medical field. The most important difficulty dealing with this treatment is capability to know about the cells life and the destiny before it is being use to others. The stem cell is going to hold a sizeable ability for an extensive application for many kind of diseases.

**Historical perspectives and the practices in present scenario**

UCB changed into been first used for a flourishing remedy of a bone marrow transplant inside the year 1988. This was successfully used for the child with one form of decreased in hemoglobin which was preserved from his own family and it's an allogenic type. It was a successful attempt for the child and doing nicely sixteen years later. From that point of the a success treatment, UCB has now grow to be an established source of HSCs for transplantation. This changed into specifically used for the child with the malignant and non malignant problems. The circumstance dealt with are like many tumors, leukemia, immuno disorders, some syndromes, bone problems, metabolic disorders, illnesses etc. There's a fulfillment remedy even if a healing of hematopoietic in recipients while unrelated UCB donors are used
and not withstanding numerous HLA mismatches among donors and recipients.

**The main importance and its uses:**

Benefits are as:

- Engraftment prospective of primitive UCB hematopoietic cells in preclinical research revealed better proliferative ability in comparison with the adult bone marrow.
- There is no risk of morbidity of the donor. They may be without problems accumulated as associated or not related person. This is being stored after processing and to be used for the later life. The umbilical cord blood is conveniently accessible and non debatable. It could be the handiest supply of allogenic HSCs available with uncommon HLA types to clients and therefore to racial category, own sister or brother recognized blood disorder problems or different distinct transplants.
- Low CMV transmission i.e. Much less than 0.1 % healthful neonates as compared adult volunteer donors with 10-60%.
- Compared with allogenic HSCs, HLA gives a good result. For the transplantation of HLA mismatch if it has to see graft and receiver ailments in UCB is less than grown up donor stem cellular due to the naive immunolophenotype of UCB lymphocytes.

**The disadvantages of umbilical cord blood transplantation**

- Single donations from a particular donor is to be had i.e. there is no chance to take the stem cell from the donor to have the procedure again.
- Need to be restrict in quantity of HSCs in the UCB unit. This transplantation ought to only be taken into consideration if a certainly matched donation includes at least about one 10th which is going to be used.
- There is a less chance of death and restrained HSC stay a first-rate limitations to UCB that can be used in adults. The variety of cell infused is directly related with the preliminary peripheral blood platelet and neutrophil restoration and put up transplant endurance and is normally sufficient to engraft best kids and adolescents. Adult and big youngsters whose weight is 50 kg may not be capable of acquired it well. It can be more practicable for
such procedures as new technology update, so application becomes very handy.

➢ any other disadvantage is that there may be a behind schedule haematological and resistant reconstitution. In adult UCB has frequently seen for treatment with superior illnesses, commonly receiving myeloablative therapies as compared from the uses of neutrophil and platelet recuperation which take more time in transplantation.

➢ there’s an unknown history of ways the variation in leukemic go back to visible after CB compared with the bone marrow transplantation.

**Cord blood collection procedures, storing and usage.**

There are so many range of method for collecting that are planned. The safety and usefulness of the CB transplantation is totally depend on the amount and the product of CB. Either the baby is born through vaginal delivery or the caesarean delivery the CB can be collected. There is a better outcome in open system compared with the closed system in the aspect of optimizing the collection volume and minimize microbial contamination rate.

**Cord blood collection methods**

First off as the child is born, the UC are cut and tight at 2-3cm from the umbilicus of the child before clamping the cord because it save you crushing of the tissue. Then the UC is cut among them and cord are being tight. The cord is disinfected in a clean procedures away of some 10 cm by putting the gloves.

**Method 1: After delivering placenta by using Hanging method.**

Till the placenta is separated and shipping, it should be waited. After it supply, placenta has to be located by sterile procedure with the UC putting all the part inside. With providine iodine and alcohol, the UC is cleaned. Then the umbilical vein is cannulated via the use of a needle associated with a general container filled with a solution of anticoagulant. A device of drainage the blood from the UC is via gravity drainage. The gathering method persevered till a float with moderate milking and then the blood bag became detached and preserved. The UCB quantity turned into calculated by reducing the amount of
the solution added. There might be want to feature sample of undiluted UCB a
good way to decide the blood count number before its collection.

**Method 2: In utero placenta aspiration**

As soon as the baby is born it is going to be positioned on the
abdomen of the mother without pulling at the UC. Within 30 seconds of
transport the child's UC is clamped and transected. At the same time as the
placenta are still in utero, UCB is gathered by way of gravity, and stored in a
bag which contained the preservative solution for prolonged uses. Then
manner of doing other may be observed as of technique 1.

**Method 3: Syringe assisted aspiration**

On this technique, it is a combination of above ways and NACL filled in
needle and syringe which will be removed again from placenta after placental
shipping and collected in any other separated blood bag. Then the umbilical
vein is cauterized using feeding tube no 8 inside the placental department
even as the umbilical artery become cauterized by the use of feeding tube
number five. By flushing with the NS solution, CB will be amassed by using
umbilical vein catheter right into a well known blood bag. There may be a
need to accumulate the records from the parents like records of obstetric
parameters, child sex, week of delivery, weight of baby and placenta. After all
such formality, UCB is dispatched to the National blood bank for processing,
freezing and garage.

**CB processing**

As it reach the bank, all the cord blood units will be sent for processing
as soon as collected in a day after CBC procedure. Whole blood & DMSO₄
will start cryopreservation on the same day. It has been bring down to final
volume of about 60 ml from sample volume by a mechanism of centrifuge
from bag and taking out WBC. So the final cell concentration is near to 50x
6₀⁶ ml.

With the aid of the technique of cryopreserved the CB units are stored
on top deep minis degree in a vapor phase of liquid nitrogen with a proper
label which can be geared up for use and transplanted to the sufferers. For
the usage of future diagnostic functions vials from CB were one after the other
cryopreserved. All the CB unit gathered are saved inside the vapor section of nitrogen.

Laboratory test
- Mean value, mean total nucleated cells, CD34 positive cells has to be monitored for the quantity of the stem cells being collected.
- Apart from this procedures, they will also the see that practicability of stem cells is monitored.

Cord blood sample sterilization.
The protocol for decontaminations implemented strictly in the collection to reduce the bacterial contamination since CBT recipient are at particular danger for infections. Health care professionals are provided with extensive training in order to make sure that there is no waste and it's done properly. Before doing freezing of the CB, full-size sterility exams have been finished for aerobic, anaerobic and fungi cultures after series of CB. All samples have been given an internal code after being registered in an inner database. A confidentiality registry is being maintained which will file all of the transmissible throughout the routine manage.

Process of transplants
The requirement is that there should be no partial clotted blood, total WBC less than 5 x 10^8 and negative sterility test is the standard criteria needed. When the cord blood unit meets all the requirement and negative serology and microbiology. Before cryopreservation, a test for excellence control of procedure and sterility controls are considered to check for its proper usage. Then the whole things are stored at the Nation blood centre.

A cryopreserved DNA vial has been selected for using an additional test such as confirmative of HLA typing or immunological evaluation, till then a demand is made for a definite transfer. The procedure of follow up is done with the parents after delivery and it has to be done till around few months. Information about possible diseases developed by the newborn is obtained and screened by this time while interacting with mothers.
The author conducted the pilot study from November 2000 to March 2002, in order to optimize the staffing, gathering, and dispensation of CB donations with future assimilation of CBB into the national CB bank. The study revealed that removal from steps which author used results in higher mean volume, cell counts without the problems of contamination. There was a very less throw away rate of CB units in this method as minimum i.e. 5% compared with the method 2 and (25% & 50% respectively). This method seems to be beneficial and safe, there are lots of complicated procedure and more personnel where required for this to performed. So it was concluded that it is better to use this treatment for the needed CB stem cell transplantation than in common unrelated CB bank. The National CB (NBB) bank which was recognized on 2002 within the national center facility to make certain that dealing out was necessary to the equal rigidity and fundamental standards requisite for other ways of HSCs. From that time 8 case of unrelated stem cell transplant has been successfully done. This has brought to the booming of unrelated incompatible allogenic CB transplantation. Thereafter the transplantation of related cord blood among sibling was also reported.
CORD CLAMP & COLLECTION OF BLOOD

STEM CELL COLLECTION STEP WISE
Application of solution

Needle insertion for the blood collection
Needle in the vein

Syringe disconnection
PLACENTAL STEM CELL COLLECTION

Sealing the blood bag and sending for cyro preservation
**Recommendation for the parents and patients to be followed:**

Some tentative recommendation for the make use of CBT are:

- Parents can planned to for CB collection if there is a need of urgent transplant for the older child and the parents had a baby born with healthy sibling.
- The parents has to get in touch with the NBB to discussed regarding the arrangement for the UCB and the responsible of the haematologist for the usage of the sibling or any other concerning the parents and the doctors.
- The indication of a successful procedure is the match of both the party.
- Also cells number needed for the transplantation should be available.
- The use of accessory cells of factors should be there.
- There should be cleared about the extent and the type of diseases needing the transplantation.
- the time drop anticipated between injury of disease and transplant and the desired price of restore if you want to effectively restore the sicknesses.
- the accessibility of the HLA matched cells make it possible to apply HSCs derived from UCB to treat or to save you or cure metastasis in addition to the haematological illness

**UCB banking**

Throughout the world there are Over 175000 CB donations are banked and available for sufferers. From 10 years there were sizable UCB banking pastime international. It's far check in within the registered maintained for the devices. Extra as of five to six thousands cases are already received benefits from CB. The significance of this bank is that the sufferers of any blood related, subsequently for tribal groups for the family affected by recognized hematological problems and for pressing unrelated donor transplants. The proportion of matched unrelated donors from many who had given SC, that cannot be determined in those registries are of racial organizations. Such bone marrow can't be stored.

UCB is being stored by means of following two essential concepts. One principle is common storage banks related in precept to conventional blood banks. Another principles within the CB banking is garage feasible future use as autocell transplantation in case an individual's calls for a CB transplant.
later in lifestyles. Therefore obstetricians may additionally manual the patients to get the message on CB facilities both Person interest in confidence prepared financial institution or for contribution to probably public CB banking. It need to additionally be informed to the sufferers approximately using owns cells for reuse, instances of illnesses can also convey a hazard on transplanted cells harbor a inherited defects ensuing an inappropriately excessive hazard for increasing the equal disease.
STORING AREA

SEPARATION OF STEM CELLS IN CLOSE UNIT
PROCEDURES

INCUBATOR FOR STORING
Focus of current and future research on CB stem cells

The expansion of strategy for differentiating CB cells in path every other than HSCs and greater indication to make use of CB stem cells inside the substitute to the broken tissues and cells will want a future development in the areas of stem cells. The diseases which can be cured or relived through the stem cell therapy may be possibly developed in order that the spectrum of cord blood stem cellular therapy adjustments. In the future, the complete of the organs broken tissues and cells may be replaced with the aid of the UCB stem cell remedy. The stem cellular remedy will repopulate and repair organs feature in a ramification of animals fashions and more lately in human medical putting. UCB stem cells could be powerful equipment for newer elements of science and preserve extensive undertake as healing equipment for cellular uses specifically in youngsters.

NEED OF THE STUDY

Throughout the primary 4 days of existence, zygote cells are termed totipotent stem cells or cells which can be so undifferentiated that they have got ability to shape a complete man or women. In any other 4 days as the structure implants and will become an embryo, cells starts off evolved to show differentiation and are not capable of becoming every person cell. They're now slated to grow to be precise frame cellular, consisting of nerve, mind, or skin cells, and are termed pluripotent stem cells. In but another few days the cells grow so unique that they may be termed as multipotent or are so precise that they have set a sure route closer to what body organ they will create. If the nucleus is eliminated from an oocyte and the nucleus of an person cell is transferred inside the oocyte, this embryo had a capacity to grow into an infant that is equal to the person donor. If its pluripotent stem cell are eliminated and allowed to boom in the laboratory, those having competence in order for supply in frame one needed by means of the grownup donor.
The gametes of 2 specific cells meet and formed a matured ovum, the process is gametogenesis. *(D.C. Dutta, 2004)*
**Formation of sperm**

Gamete

Oogonia of sperm

1st spermatocyte

1st meiotic divided

Secondary spermatocyte

23,x 23,y

2nd meiotic

23,x 23,y 23,x 23,y

Spermatids

Mature sperm

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**Main actions: (D.C Dutta, 2004)**

- Ovum fertilized: 0 hrs
- Two cell forms: 30 hrs
- Four cell: 50 hrs
Twelve cells : 72 hrs
Sixteen cells : 96 hrs
Day 5 : Blastocyst
Day 7 : Implant starts
Day 9 : Endometrial
Day 11 : Growth begin
Day 13 : Villi initiate
Day 16 : Villi secondary
Day 21 : Tertiary villi
Day 22 : First heart beats.

According to Vani RJ (2017): FORMATION OF PLACENTA

By 14-18 days of the regular cycle, the ovum is produced

After fertilization, within 1-2 days, the zygote formed

Cell started dividing

A mulberry type cell formed called morula

Thereafter, all the cells are filled inside with a watery fluid called as blastocyst

Around 22 days, the matured ovum tried to implant at the cornua of the uterus

After 26 days, it become a place for growth

Primary villi developed to attached at the wall of the uterine layers
From this layer, two new division are created.

Maternal surface have 15-20 lobes

Thin transparent layers above toward the cord.

Finally a term placenta formed and carried out the function.

Some of the deviation from normal creation: (Wani RJ, 2017).

1. Marginata:
   A kind of translucent round ring formed at the margin of it.

2. Battledore:
   Attachment at the corner of the placenta. Look alike as bat for playing table tennis.

3. Velamentous:
   At the membrane only, the cord is hanging.

4. Bipartite:
   The placenta is separated at two parts with different lobule.

5. Tripartite:
   It is one type, where three parts with different lobes.

6. Circumvallates:
   A transparent circular layer around the place where the cord joined.

7. Succenturiate:
   It is another form where an extra lobes are present in the organ, it will have a high chances of staying back in the uterus after delivery.

8. Huge size of placenta:
   This is a condition where more than the normal size and shape, the organ looks huge.

9. Cord short and long:
   Deviation from the normal length of the cord

10. Hole:
A distinct variety where a part of the organ are not seen while develop.

**PLACENTAL DEVELOPMENT**

According to Ward SL (2010): **BLOOD FLOW IN THE FETUS**

Fetus survive from the mother blood as a process of exchange happen between the two layers.

↓

In 2nd week, there forms a sac by then.

↓

Vessels for blood flow initiates by 18 days

↓

A primary organ for blood supply form which are joined together by villi
By 3rd week, heart function and the first beat start.

All the capillaries form and embryo receives the maternal blood

Whole function of the baby is carried out now by placenta

In one month, the cord structure arise from connecting stalk

Mainly 3 vessels can be seen, one vein and 2 arteries

In the liver, a minimum quantity goes, then come back to heart

Foramen ovale is the way to get the blood bring back to right atrium

Right atrium  ➔  Right ventricle  ➔  Aorta

Through this channel, blood flow to head, upper and lower parts of body.

20% of blood goes to lung for purification and development of lung

pulmonary vein

Left atrium  ➔  Left ventricle  ➔  Aorta

Back to placenta by 2 arteries
Following this ways the whole activities of the blood exchange takes place

**Fetal growth**: (Ward SL, 2010)

The period of embryo formation starts as early as two weeks of fertilization. The stages of changes of the organ begins.

1. **One - two weeks:**
   
   Mature ovum starts cell division and by day 7, implants initiates. 2mm in CRL and blastocyst also attached to the deciduals.

2. **Three - four weeks:**
   
   Fetus weight 0.4 gm, bent in structure, heart beats can be clearly listened by sonography.

3. **Five-eight week:**
   
   CRL is 3cm, prominent composition can be seen. Boy and girl cannot be able to make out. Around the cord the small and large intestines be found. Sex organ is formed. 2 gm in weight.

4. **Nine- twelve week:**
   
   19 gm, a mini baby is created now. Head is big, eyes closed, pink in color. Complete measurement, lengthwise of extremities is seen. Intestines goes to stomach. Sex organs seen outside. 8 cm in extent.

5. **Thirteen - sixteen week:**
   
   13.5 cm, ears developed. Length is appropriate. Limbs form well. Hair growth is good. 100 gm gain in body weight.

6. **Seventeen- twenty week:**
   
   300gm and 18.5 cm long. First movement of fetus felt by mothers. Baby will be covered by vernix caesosa and lanugo all over the body.

7. **Twenty one-twenty three week:**
   
   Some respiratory movement, nail growth started and folded skin. Fat form in the body. Weight of 60 gm with 23 cm CRL.

8. **Twenty four-twenty eight week:**
   
   Lots of hair, more amount of subcutaneous fat, open the eye with lashes. 1100 gram and CRL as 27 cm.

9. **Twenty nine-thirty two week:**
Length and weight proportionately growth. Testes descends in scrotum. Shiny skin, nail over the toes and finger. 31 cm and 1800 gm.

10. Thirty-three-thirty six Week:
Total weight reached to 200 gm, CRL as 34 cm. Cord seen in center. It's now full term. Baby with lots of creases and wrinkled. Flexed the legs and hand completely. Arm closed and open.

11. Thirty seven-forty week:
Body sex parts are well prominent, in girls labia minora covers by labia majora. Skin look more slivery an pinkish in color. Breast develop and protrude. Lobes of ears seen distinctly. Folding of the skin seen everywhere. Total weight is 3200gm and 40cm length.

According to (Reeder et al, 2014): Transition of the organs after birth

1. Inferior vena cava:

Blood from venous and placenta is brought, now it takes only from the right auricle.

2. Aorta:

Both ventricles blood were brought back after born, then it takes in from only left ventricle.

3. Pulmonary arteries:

Lungs oxygenated blood to taken in, now more amount of blood carried out.

4. Lung:

Less blood and absence of air flow, after birth lots of air and blood flow supply.

5. Foramen ovule:

Transmission of right and left auricles, now the hole is closed, some cases it still does not closed.

6. Ductus arterious:

Taking to aorta from pulmonary artery, now name is changed to ligamentum arteriosum.

7. Ductus venosum:

It was going through inferior vena cava from arterial below, turn to be as ligamentum venosum.

8. Umbilical arteries:
Placenta received blood from arteriosus venous, now turn as ligaments on anterior abdominal wall.

9. Umbilical vein:

Received lower body and heart blood from arterial, now exist as round ligaments of liver.
Circulation of utero and feto placental

Flud movement: (D.C Dutta, 2004)

Blood flow from mother → Layer of epithelial

Placenta → Fluid for baby survival → Skin & urine

Transfer from Lungs → Baby engulf

Food pipe absorb H₂O → Circulation in the fetus

Circulation of fetus and placenta: (D.C Dutta, 2004)

- 400 ml / mt: Blood goes from the placenta
- 60 mm hg: umbilical artery brings the blood
- 10 mm hg: umbilical vein gets in
- 30 mm hg: pressure to villi by capillary
- Saturated oxygen: 80%
- Partial oxygen: 40 mm hg

Placental hormones: (D.C Dutta, 2004)

- **HCG**: Lots of hormone are responsible for the placental task. It stimulates progesterone and also regulate the thyroid function. It should be around 200 IU after the confirmation of pregnancy. Present throughout the process but as the baby is born, within 2 weeks it cannot be found anymore.
- **HPL**: It helps to regulate glucose and amino acids for baby. The normal level is 5-25 g.
- Oestrogen and progesterone: It is produced from the placenta. It makes the cervix to dilate. Placenta can adjust and fetus grow only through this hormone.
- Others are:
  - HCT
  - CRH
  - GNRH
  - TRH
  - GHRH
  - ACTH

**Blood constitution:** (D.C Dutta, 2004)
- 500ml: Total amount of blood in placenta
- 150 millilitre: Presence in intervillous part
- 600 millilitre / mt: Amount of blood flowing in intervillous part
- 50 mm hg: force while contract in uterus
- And 150 mm hg: While retract
- 80 mm hg: Inside artery
- 8mm hg: Within vein

**Mechanism inside placenta:** (D.C Dutta, 2004)

Some of the activity are:

1. **Weight inside molecules:** Decrease the level of it, like less than 1000 means able to maintain a good movement of molecular particles
2. **Soluble lipid:** it absorb very rapidly
3. **Substances like polar:** A minimum amount could enter even if the weight of molecules is more
4. **Space and activity:** Maintain a good equilibrium
5. **Speed of the movement and action:** Both the layers do good transfer of nutrients.

Stem cellular researcher are investigating the opportunity that if stem cells which include those had been implanted into an grownup with a situation which includes spinal cord injury, diabetes or blood problems, they could changed the person damaged cells, most of the people of embryo used for studies these days are extra embryos that had been removed from the mother's body as part of the process of in vitro fertilization and had been not
used. As thrilling as this vicinity of research is, it additionally includes ethical and steeply-priced consideration, for example, if stem cell remedy turns into viable on a massive scale, how will sufficient embryo be available except they're grown only for this reason.

The stem cells have the potential to multiply in an multiplied state. They've the capacity to self-renew. Embryonic stem cells may be lonely from the other cellular bunch of pre-implantation embryos all through the blastocyst. It can distinguish into surely all particular cellular kinds and because of this are taken into consideration pluripotent. Due to the fact exclusive human ESC strains were derived from exceptional embryos, it isn't sudden that extraordinary strains, will show distinct gene appearance traits. Inside this famous class of stem cells there are in addition to those derived from embryos, the ones known as embryonic germ cells.

Pluripotent stem are the outcome of the conversion of grownup. Even though pluripotent, the ones cells aren't always equal to ES cells despite the fact that they're comparable. The reprogramming to start with transfection even if there are some of efforts in improvement to carry out the reprogramming without the usage of it. Pluripotent stem cells can result in teratoma formation as like ECSs. Persons SC can be placed on many ways of body’s frame. They are thought to be vital to the restore means inherent to many tissues and organs. Additionally they in famous are tissue particular; but, there are a few instances.

It is very important to understand the principles and the guidelines which need to be followed by a researcher while undertaking study on this area. The importance of the stem cell therapy is rapidly evolving in the field of medical. They are exceptional in numerous way.

They followed many principles for doing the procedures such as essentiality, consent, preventative measure, competency, liability, precision, awareness, field, responsibility and compliance.

Stem cell has a two basic characteristics. They’re capability of self renewal and multi lineage differentiation. Stem cellular can live on for an indefinite period and distinguish changeably as it is given to the recipient. They will also deliver upward push to tumours which includes many varieties. The maximum essential worries while acting the system of placental stem
cellular is that the step of doing the procedure like to collect, process, store in particular of the HSCs.

**Following major concerns to be keep in mind while performing the procedure.**

1. Health and safety: The knowledgeable consent need to be obtained from the couples. They must be well-versed approximately the necessitate of screening of communicable sicknesses. The donor have to be knowledgeable approximately the banking and they have to keep in contact with the financial institution. It’s miles important to make sure that the givers are not demoralized and commercialized.
2. Stem cellular product manufacturing: Parents have to be informed about the shoring tactics and the sort of processing done for the storing of the stem cell. Suitable fine manage and assurances should be in place.
3. Ways of doing: It is necessary to planned carefully a clinical trials for the stem cell and time to time follow up is required. tem cellular therapy is critical that stakeholders worried in the medical trials related to stem cells are absolutely conversant with the modern guidelines within the subject. It is vital to make certain that no unproven stem cellular remedy is obtainable outdoor of the well-managed scientific trials.
4. Prerequisites: Preferred ideas of biomedical studies, precise concepts want to be involved so that it will modify the stem cellular research paintings.
5. Social responsibility and rights: Many time studies on stem cell has come to be the commercial price. It's far important to hold an amazing courting so a percentage of the advantages may be make use of via the network, this are the populace which incorporates patients, own family and the research corporations.

**Uses of stem cells for therapeutic purposes like:**

1. The makes use of the stem cell remedy is not particularly fixed. Predominant uses of the stem cell remedy is HSCs transplantation for haematological disorders. All the stem cell therapy is treated as an investigational and carried out most effective within the type of a proven experiment after obtaining required regulatory agreement. The usage of this
for every cause outdoor the area of medical check can be taken into consideration immoral and subsequently is not acceptable.

2. The product for transplantation for use for medical trial will be loose from animal merchandise and microbial infection.

3. The banking centres for stem cell medical trials must be registered in the licensed accepted centre.

4. The public investment organisation who are comparing the have a look at or the health ministry’s screening committee shall make certain that the documentation provided by means of the taking part united states of America fulfills the necessities as according to the regulations and law flamed through the authorities.

5. Researcher accomplishing look at on the stem cellular ought to be thorough approximately the methods and approval have to be taken.

PSC is the collection which is consistent developing tries and consciousness approximately the stem cell is a sensation inside the medical network. There are many benefits of the stem cell remedy, some of the recent makes use of many health issues. For the past few years, studies being finished on stem cells are aimed to use within the restore of accidents to the coronary diseases, many illnesses etc.

Inside the modern-day posted take a look at by means of the usage of kang et al had stated the about the UCB cells to re-establish sensitivity and mobility to a spinal- twine harm affected individual.

Many research have been carried out on stem cells and it turn out to be stated that UCB includes an boundless, non-debatable area of SCs for remedy.

The SCs from the UC and placenta display a top notch powerful within the remedy of leukaemia. The patient with leukaemia sufferers should depend upon receiving bone marrow transplants from donors. There is a need of a closed in shape or the patient develops critical immunological troubles. The near healthy happens with the sibling and parents so they’re the first-rate hazard of being an awesome healthy. A take a look at additionally shown that sixty eight sufferers with leukaemia. The cases of receiving not proper related SCs were more. But to some extent almost ninety percent found to renew the
cells. Simplest of the client of twenty percent advanced extreme resistance troubles in comparison with fifty 5% of other patients, superior issues following dispatch entirely related SCs. A miles belief of fact that UC is undeveloped in the auto immune, it become accustomed in affected character’s frame more than the other cells. They are in plenty, immunologically supple, going to be a safe for any ailment resolve.

There are lots of advantages about the stem cell from UCB and placenta over bone marrow due to the fact CB does now not require similar, much a smaller amount occurrence of disorder like provider and receiver. The stem cell are banked and is to be had to be used as a off the shelf. It turn out to be decided in ultimate 12 months that stem mobile to encompass a giant pattern of HLA kinds. Within the twelve months 2004, there had been over sixty thousand UCB collected. The prediction of above three hundred, some 1000 devices from both the sectors. The maximum extensively used SCs are of MSCs from BM, additionally referred to MSCs, following is hematopoietic stem cells. The very nice concentration inside the marrow cavity is located in this type. Simpler and less effort procedures is collecting from the PSCs and tissues which usually thrown away everywhere in the hospital than drawing from ABM.

It can be store for a long period of time after being frozen in minis degree in a cryo method. At some stage while gathering of those tissues, there can be no health effect on both the mother or the new child. Presently five registry centers are well equipped in doing the SCs collection. The changes occur during all this phase are also brought out. Such techniques for separating are sturdy place at a few stage inside the zone independently isolated tissues. Undoubtedly, it has made a gate way for free certification, manufacturing, also a huge-group loom.

Human stem cells is derived from 3 basic assets. They are ESCs derived from aborted foetuses or fertilized eggs, UCB cells from the new child infant, and grownup stem cells which may be isolated from an man or woman’s tissues after which grown in tissue way of life. The umbilical stem cells instead of embryonic are typically a unique cells that hold t functionality in discriminating to similar kinds which lets in restore or replacement.
The umbilical and placental stem cellular therapy were in use by way of the FDA and other authorities for the treatment of many ailments on the grounds that 1980. In 1988 the first UCB cured a blood most cancers. More than 1,000 CB transfusions, commonly in kids with leukaemia, had been efficiently carried out within the U.S. With very little component results. In the latest research, it became proved that this SC have alike powers and fitness promoting blessings as do ESCs. Every day the brand new generation has made new invention to make the stem cell remedy more powerful.

The garage of SCs loaded received as of one's UC be able to display remarkable probable coverage many sort of ailments which are severe. Because the quantity of baby born in our country could be very high ordinary and always discarded the placenta as ordinary. The method of the UCBB includes the reducing then by artery forceps cord clamp. Sterile equipment design by registry bodies with all bar coded being provided to collect CB. Once the syringe is put in UC vein attached from bag, thereafter it should decrease diploma at the manner to permit the whole contain to be collected. Once it is completed, SCs are ready to crop from CB and ready to keep in cryo under less than -196 degree Celsius.

A few might also say the fee of UCB storage that is at the cost of around Rs 35,000 for storing a period of 21 years in a great quantity, however evaluating it with the advantages of the child’s and one's personal destiny will help one placed things in angle.

Numerous research at the uses of the placental and umbilical stem cellular are being in technique and lots of trial are being carried out. UCB are the main that had been used for formation of HSC. Stem cellular therapy is increasingly more being consider in remedy of both types of tumours growth. The maximum currently identified supply of stem cells is the UCB and it seems as only BM whilst older BM isn't to be had. Within the last 10 years, the medical uses of UCB cures have expanded with a rising wide variety of illnesses treated by this.

The UCBB has become greater obvious within the area of clinical utility greater big internationally. The enlargement of UCB banking has caused the status quo of UCB first-rate standards by expert companies inclusive of AABB. The pleasant practices expectation for the gathering, checking out,
dispensation and banking of the UC banking for transplantation. Whilst standards accurately cover UCB banking, pointers concerning other problems consisting of those with moral implications.

In India and different international locations private UCB banking dominates, proscribing popular public get admission to promising healing procedures. Similarly, global, medical experiments for a diffusion of sicknesses are in progress regardless of insufficient studies and firm lapse.

**Some Regulatory bodies around the countries**

The position of the government is they need to play vital role within the UCB banking however it is still stays unclear. Inside the evolved and growing nations with a collectively available healthcare device. A tough mission of contemplating the qualities and financial side of organising a national network of public UCB banks will faced a competition with personal banking. There’s a want of a strategy outline to manual the choice-taking in those tactics.

Stem cellular remedy is a current difficulty and the research continues to be gaining enjoy right here, and various authoritarian or guiding principle troubles concerning others application for innate problems and contagious diseases which may be but concerned similarly to the outline strategy made under Indian council of clinical studies and branch of biotechnology. They offers a hints to help with stem cellular studies and its problems. Round 0.25 in line worldwide combined of SCs are carried out in our country, handiest 3 research certified centers are outfitted inside united states of America. There are unique ethical issues associated with non-public banks for CB and law holders can’t map the outlook of this bank with no considering life of personal or functionality characteristic in gathering prospect quantifiable desires, further to genuine and capability involvement to analyze in the challenge. It’s a immoderate time to pay crucial and concentrate on the socio-moral and prison troubles adjacent UCB banking and uses.

In Canada, the affiliation made a popular for the umbilical cord collection and banking. The transplantation from the stem cells, tissues and organs is presently in research. Protection of UCB banking practices necessities are being set by way of accreditation our bodies to help to promote it, no matter the fact that the accreditation technique remains
voluntary. Consequently, it cannot be relied upon to guard most people situation with reference to UCB-based totally therapeutics.

From some of the organisation like society of OBG of Canada scientific practice recommendations and AAP had made a clean pointers approximately the compilation and long-standing garage of UCB. It isn't always endorsed to have a autologous donation due to the confined indications and absence of clinical proof to help the exercise. There is a less known fact about long far the stored cells is going to be use in the lifetime of a person as the autologous HSCs storage is mage to be confined. And moreover when there is a known history of inherited conditions or cancer then it's of no use. The expectants couple have to be nicely informed and deliberate and make a stability on the options of donating the stem cells and banking. There may be 10,000 UCBT international consistent with 12 months the use of publically banked CB is just made as an approximate by the countrywide software. Consequently, it's miles crucially large plan to set up lots of public centres throughout the arena.

Many of the corporation had issued a number of the principle of proper of UCB banks genuineness of business enterprise for own employ want to screened in order to promote a carrier which has currently no actual use concerning restoration options. As the future regenerative medicine advanced to superior self SCs, fact goes to get oneself very personal CB saved at shipping ought to boom the risk of gaining way in to new treatments. It's far was hoping that this kind force show of specific rate in treatment and re grown remedy, however, things are still in dilemma situations.

**Potential packages umbilical cord blood for medicinal Usage**

Regenerative medication is a subject of remedial studies inside the treatment of many restore and re grow of many particular tissues in the frame within the developing international locations. A lots of prevailing can be made for future sciences as this cells can do wonders for many ailments. MSCs is a cellular kind in UCB , as a useful beneficial for non-HSCs primarily based definitely restorative strategies on the way to replace an ill-treated or other connective tissue. There are a few different logical cell kind to be used in tissue engineering and regenerative treatment. A recent take a look at
additionally showed this cells were in most cases EPCs competent of preservation of endothelial lineage in lengthy-time subculture. The latest examine with the aid of Li el at effectively worn micro-encapsulated UCB cells for liver harm in rat. So it was proved that in future there is a opportunity for transplant of liver. It was already shown in the past study that apart from this many diseases are been treated by this cells.

The selection chosen in application to produce changes for in born conditions is from the use of one's very own stem cells derived from UCB. Such type helps better for curing this disease. So it is taken as a best to be had to the ones where the consent is to be made by parents to store their UCB. Dr Harris in his worldwide forum for SCs studies proof that capability for CB to enhance results following coronary heart problem in 2007.

There are various studies in various animal that had verified that UCB stem cells use have potential emigrate to the vicinity of mind harm assuaging kind of features. Scientists have showed that SCs can discriminate into the cells which can be indistinguishable from other cells. Masses of have a look at on using human UCB stem cells into animals to treat lots of major ailments.

Lots of such findings had mean that kids whose UCB stem cells are to be had for personal prospective usage may be a few one to enjoy the greater current studies in UCB transplantation whilst now not having the hazard of refusal via the immune system.

**New techniques of UCBT**

There are masses of treatment out of UC stem cellular likewise to tumor and many large remedy for the transplant, reduced depth conditioning intensity with lots much less toxicity. A study with the aid of Brunstein et al stated consequences in one hundred ten adults transplanted with UCB for hematological illnesses with ninety two consistent with cent sustained engraftment, 19 in line with cent TRM and 36 months basic survival (OS) of 45 in keeping with cent that's just like those with different stem cell sources. So it's being observed consequently that with co-morbid conditions like geriatric are expelled from such transfer considering age, shortage appropriate related giver and people.
UTILIZATION OF PLACENTAL STEM CELL

STEM CELL THERAPY
UCB stem cells availability

UCBB may be multiplied over 4 hundred-fold with the resource of way of life strategies that may block mobile differentiation with removal of positive components like copper. A look at by Peled et al indicated that a copper chelator effects is going to be liable for boom in long time manner of lifestyles when used for three week. A have a look at moreover established that there may be a unique advance to UCB cells. The paintings with the useful resource of Delaney et al is maximum shows potential as it is the initial instance of speedy enrichment of extended cell in people. So it take a look at is transferring to section II trials inside the U.S, and the effects are exceedingly anticipated. Loads of more studies concerning precise processes to SCs spreading out are in progress within the studies and near the beginning scientific test setting.

UCB banking is a wealthy supply of progenitors for hematopoietic stem cell transplantation. Our country has terrific prospective for bank for SCs due to a lofty start charge and inherent variety. Almost 70% of sufferers require bone marrow transplantation from the donor as they are now not finding the match within their circle of relatives. In these days scenario ,the entire variety of transplants done in India for SCs is not so good specially because of soaring fee and restrained wide variety units available towards the expected requirement of 30,000. The 3 public banks for such are most famous figures and are probable to enhance inside the upcoming years. It could offer a numerous supply of excessive exquisite grafts for sufferers of beginning global. What is growing here is the private, as a lot of families favor to maintain UCB in personal banks with feasible benefits in within the destiny as presence of some degenerative problems. Complete contribution with sizeable venture through authorities allowance is the goal of US in coming treatment plan. With a better starting inclusive of structure will aid an UCB programme in order to be consultant for all areas of the United states of America.

During the 1970’s researcher observed that UCB should supply the equal type of HSCs with that of BM. Hence forth banking commenced by using accumulating and storing UCB. CB stem cells are banking commenced via gathering and storing of it. CB stem cells are presently used within the
remedy of several lifestyles-threatening diseases, and play an critical role within the remedy of blood and immune gadget related genetic sicknesses, cancer and blood problems. The primary clinically documented employ of CB cells become a wonderful treatment of a six-year-vintage boy affected by Fanconi in 1988. For the reason that then, it has grow to be more and more recognized as a resource of SC best for stem cell remedy. Rajeshwari C (2015) carried out a look at on understanding and attitude of fitness specialists concerning placental stem cell, upkeep and utilization. The study concluded that 84% of fitness professionals had inadequate expertise and 25% had neutral attitude.

Rachna Gill et al (2018) study on CB banking. The objectives was assess, co-relate the knowledge and attitude with various socio demographics. Descriptive survey approach with Purposive sampling to select 150 health care professionals working in GGSMC &H, Faridkot (Punjab). The finding revealed that maximum no. of health care professionals (55.3%) had not enough knowledge and most of them (98%) had positive attitude. Also regarding attitude majority of health care professionals (98%) had positive attitude and only 2% of them had negative attitude regarding placental stem cell, cord blood banking and its utilization. The co-relation of attitude regarding placental stem cell, CB banking and its utilization according to age, sex, work experience, educational status and designation was found NS at (p <0.05) level. The study concluded health care professionals were having inadequate knowledge and had positive attitude regarding placental stem cell, CB banking and its utilization.

Ujala Joshi, et al (2017) , study to provide STP . The design used was a quantitative research, one group pre post test only . Population were the nurses working in delivery unit and maternity staffs. Convenience was the sampling technique chosen. 60 staffs work in labour room. The main information were able to gather through a structured knowledge questionnaire on knowledge of UCB. Data were analyzed from the test scores. The findings indicated  21-25 years where more than half (53.3%) and hundred percent were lady. 91.7 % had from GNM i.e mostly diploma holders. 31.7% at least work over a period of more than eight years. In context of any exposure before,  47.7% were from labour room,40% had delivery room and hardly
18.3% got to expose in OT. The main information the group received were from other than book like paper, TV etc i.e 61.7%. So after the test scores the mean of the knowledge score of post test 23.6 is more from pre test 13.68. The study was concluded that such education programme help them to improve their skill and STP was very effective evidenced by after STP knowledge scores.

Amandeep Kaur (2017) study on UCBB among Antenatal Women. The goal was to know the knowledge and mindset regarding stem cells and UCBB among antenatal women attending antenatal OPD. 100 women was selected by convenient sampling. The design is descriptive in nature. Data was collected by using Likert scale. The result revealed that knowledge score of 49% average, 47% had moderate and four% suitable understanding concerning UCBB and SCs. In terms of attitude 75% antenatal ladies had high-quality mind-set and neutral attitude(25%). The outcomes of remark have been calculated by means of locating out the frequency and percentage. There was susceptible high quality correlation among knowledge and mind-set regarding stem cells and UCBB. The finding has shown that there's a want to improve the notice a few of the public and there play a critical position through the health professionals.

Lisa Peberdy et al (2016), an integrative assessment became used the CASP tool turned into used to decide validity and quality of the research. Based on the inclusion criteria, nine papers from the worldwide literature was chosen. Their evaluation shown that there was slight cognizance positioned on ANC professionals’ information of bank on CB options in spite of these people being recognized through expectant parents as their favoured, as main knowledge providers. The study concluded that limited excessive exceptional research have studies what specialists understand and speak to expecting dad and mom concerning CB banking. In addition research ought to awareness on knowledge share to them. Also this understanding impacts professional exercise around delivery is also very important, so that the proper information is given to them.

Amisha S Amin, Vinaya Kumary T, Viji Prasad (2016), study on knowledge regarding UCB stem cell therapy on staff nurses. The objective is to decide the extent of knowledge concerning UCB stem cell remedy. The
knowledge level was assessed by an established structured knowledge questionnaire. A hundred workforce nurses in selected sanatorium. Non-probability comfort sampling method changed into used. Statistics analysis changed into completed via descriptive and inferential information. The evaluation of understanding concerning umbilical cord stem cellular therapy amongst staff nurses showed that majority (90%) had negative expertise and most effective 10% had average know-how. The findings depicted the affiliation between information scores and few decided on variables like previous expertise and supply of records at 0.05 stage of importance. The study concluded that the group of workers nurses’ have poor understanding on UCB stem cell therapy and there may be a need to educate the team of workers nurses at the equal factor through in-provider schooling. These studies have proved that mothers do now not have sufficient expertise approximately placental stem cell and they count on their fitness professionals to offer good enough facts regarding placental stem cell. Delivery unit workforce must receive training in standardized CB quantity and lessen the withdrawal due to man handling problems. Consequences confirmed that, majority of body of workers nurses are having bad know-how regarding umbilical cord stem cell therapy. Accordingly there is a terrific need to train workforce nurses concerning UC stem cellular therapy.

Vivitha S Pinto, Pushpaveni NP (2016), study on the effectiveness of STP. The purpose intend to assess extent expertise among team of staff workers concerning collection of CB for stem cell remedy. A pre-experimental layout, with handy sampling approach became used. 50 team of workers nurses have been the pattern. STP changed into carried out and put up-check became performed after 7 days to discover the effectiveness. The pre-take a look at know-how scores have been located to be 43.05 percentage and after STP the put up-take a look at knowledge rankings of team of workers nurses was found to be 77.45 percent which greater through 34.4 percentage with the t-take a look at fee 25.96 and chi-square value 80.18 that's full-size at 5 percent stage. The end result proved that STP become effective in enhancing the expertise of group of workers nurses on collection of CB for stem cellular therapy.
Diana LP Kim, TS Ramasamy (2016), study to assess the knowledge, focus, notion of clinical students on SCs. Qualitative study, cross-sectional survey was executed. The information was collected through online. The very best feasible rating turned into 20. The locating confirmed that most of the contributors had been female (56.7) and language was Chinese (62.4%). Maximum have been known of SCs, despite the fact that seventy eight% cited that their information become not received anywhere. General score of information ranged from 4 to twenty (12.5±3.2). No extensive affiliation turned into found among any demographic factors and the extent of information. The study concluded that clinical college pupil are responsive about SC perception hold experience in the subject matter remains restricted of their medical curriculum and they have mild level of know-how regarding stem cell.

Lye Jee Leng et al (2016), study on association between nurses’ knowledge and attitudes toward stem cell application in medicine, Singapore. 97 nurses trained in midwifery and neonatology picked up by random sampling method. Using a self-administered questionnaire. Majority of the nurses (n=84; 86.6%) surveyed had a moderate knowledge about stem cells in medicine. More than half (n=59; 60.8%) nurses shown a constructive approach in the direction to remedial possible of stem cells in medicine. There was a SD in total knowledge scores and nurses clinical working experiences (p=0.003). The majority of nurses showed a positive attitude regarding SCs application in medicine. The study concluded that there is a need for in-service educational programme to enhance the impact of knowledge and attitudes on stem cell application to integral in contemporary health care needs.

Ratajczak M.Z (2016) study on the stem cell and clinical practice. In this review, medicine and the mechanisms that designate their useful outcomes are mentioned. It additionally highlighted the initial outcomes of scientific trials as well as the rising troubles regarding stem cellular treatment options. The observe also conclude that there is a need of studies and lots of scientific trial to be executed on stem cells.

Poomalar G. K, et al (2016) study on CB banks. The study design was a cross sectional observe accomplished on 365 expectant mothers came for
OPD visit in OBG unit. 45% of pregnant lady had knowledge approximately makes use of UCB utilization for the duration of being pregnant. Only five % of pregnant ladies know about price of SC garage. Hardly 1% expressed about the idea of having CBB in public sector. 72% of them started showing some kind of interest towards the CB once the importance and accessibity are oriented to them. The study concluded that understanding about CB is gone astray. In particular most of them are ignorant of CB public bank. Non-public banking may be useful for people with circle of relatives participants exaggerated with health issues accountable to HSC. It also highlight the necessity of some help from the policy makers thereby the registry body can smoothly operate. Expertise about bank on CB is missing among expectant . Specially majority of them are ignorant of the functioning of public CBB option. Bank for non-public could be specifically beneficial for people having children participants pretentious with many ailments.

Catherine, et al (2016) study to find the effect of STP of CBB and SC. 50 sample had been taken for data collection. Assessment by tool comprises of two sections. Section A comprises of demographic data which includes age, gravida, education, availability of mass media, occupation of the head of family, occupation of self, family size, type of family. A structured questionnaire was used. The tool was developed by the investigator which includes 18 questions. The findings indicated that a difference in knowledge on stem cell and CBB among antenatal mothers at p=0.001 level. The findings revealed that after the STP, none of the mothers are having inadequate knowledge score, 28.0% of them are having moderate knowledge score and 72% of them are having adequate score. The study concluded that there is a need of such educational programme for the mothers so that the importance of the stem cell therapy will be spread to the society.

Soon Lean Keng, et al (2016), study to determine the association between nurses’ knowledge and attitudes toward the application of stem cells in medicine of Kelantan, Malaysia. Design applied was cross-sectional study being employed on 97 nurses trained in midwifery and neonatology by random sampling method. Information was collected through questionnaire. The study finding revealed that most of the nurses (n=84; 86.6%) surveyed had a reasonable understanding about SC in medicine. More than half (n=59;
60.8%) of the nurses revealed an optimistic attitude in the direction of the remedial prospective of SCs in medicine. A difference in total knowledge scores and nurses’ clinical working experiences ($p=0.003$) was seen. The majority of nurses showed a positive attitude on this aspect. The study concluded that there need an implementation of an in-service educational programme so as to promote to enhance the impact of knowledge and attitudes on stem cell application to fit contemporary health care needs.

Vijayalakshmi S (2013) reported to analyse various steps of CBB on pregnant women. An exploratory descriptive research layout became used for the have a look at. 100 antenatal mothers were included in the study. The consequences of this observe discovered inadequate expertise on CBB and its packages among maximum of the pregnant women. There has been a massive affiliation among the understanding score and the variables. 425 sufferers completed the survey; 37% had no information of CBB. Maximum of the antenatal moms had bad expertise rating (95%) concerning collection and storage of CB banking. Lack of information was among 78.2% of them. Age and education play vital role on having understanding about the subject. The study concluded that UCB become as soon as notion of as a product of no uses. Families are trying to find records approximately whether or no longer to save their new child's CB this days after the first successful UCB transplant. The primary resources that an expectant own family relies upon directly to advantage more know-how about CB banking so that they can make an knowledgeable choice through the childbirth educators. Preserving UCB in PB is really useful while need for own family; but, it's far endorsed in case who are planning for CB storage can only recall personal CB banking.

Anna Margaretha Wagner, et al (2013), reported the study findings as that the majority 82% accept the UCB to be stored, studies and therapy with the aid of a minority (38% of all responders). Hematologists displayed most of the contributors the best attractiveness costs. This look at identified factors associated with the nice in UCPB specimens, and distinct amazing skill for such series inside an banking of UB cells. Thinking about that at the take a look at location specimen collection is finished solely by way of nurses. The locating factors that have a powerful have an effect on quantity and cellularity and is critical for essential expertise for receiving immoderate good amount of
sample needed. It clear about the want to expand and get better practical competencies of the maternal crew at the same time as dealing with the placenta in the 0.33 degree of shipping to achieve goal. That's how, the function of the staff working in such area should control a tactical for the UCPBB medical personnel. It was concluded that there's a lack of knowledge regarding ethical attention amongst health care specialists. The check accomplished banking of UC and the opportunity of guarantee specific skill by the issuer group might be prime thing to be keep in time for this procedures. Uncertainly, lack of time, financial support to carry out research had the limitation to rationalize completely. But for the future practice the skill needs to be followed. By comparable manner, the pleasant way scheduled may also want to feature a guide to be used by obstetrical experts, in particular oldsters which are beginning as health care providers, due to fact the consequences of better outcome needed at a education medical institution.

**Zhurova M, et al (2012)** study on Red blood cells from CB comprise fetal haemoglobin which is essential for baby's, consequently, might need extra suitable child procedure than presently transfused grownup red cells. In this study the assessment on CB was being done. They also conducted a test on this cells for the use of a vast panel of satisfactory applications. It was found that there was no sizable reduce in red cell of CB exceptional while at a normal temperature storage in 1st sixty five hours. The study concluded that the ratio of CB to anticoagulant became related to RBC exceptional and desires to be optimized. This know-how will help out in destiny improvement in transfusion product.

The stem cells acquired from UCB are much less possibly to be discarded in treatment than adult SCs. UCB create drastically few herbal cells, growing a huge diminish in negative response, and can be used as a honestly moral therapy apart from immuno immature. Studies suggests that a mismatch can sites nevertheless affords booming medical effects. In truth, the charge of rejection for CB stem cellular is lacking of the charge of denial. UCB collection is commonly finished by way of obstetricians, midwives and nurses who've obtained schooling on this region. It is amassed by using a not direct
and easy approach after reducing the UC from the new child. The two strategies of CB collection in practice are from inside the uterus and outside way, in the first one collection is carry out only after the baby is born. But before that make sure the placental is not thrown away. Rather immediately can collect the needed SCs. Another type is where from within the uterus. As before the procedure start, the role of a nurse is usually providing pre preparation, taking consent, label the bag, arrange the articles and sending of the sample. Normally after the UC is clamp, the anticoagulant is flush into the vein of the cord by using syringe. In some cases, CB can be accrued into tubes in preference to a set bag, also the usage of sterile method. The container is connected to the tube and following a closed system , the blood are being drained from the vein. The maximum amount that can be received may go up to hundred and ten ml. The most important guideline is the whole procedure should complete by ten minutes of time. Hence, the health personnel as a part of the team always are responsible for all degrees of drawful.

Therefore, staff have to be informed and conscious of current ways in analysis, remedy. Ongoing schooling affords means through which nurses can continue to be updated with cutting-edge tendencies, keep their capability and fulfil requirements of skill of nurse. They are as a consequence goal to incorporate understanding, expand vital wondering abilities and it's miles essential to use that understanding into action. Consequently, we want to be knowledgeable on the aspect of gathering and maintaining UCB for upcoming utilize in treating illnesses.

Many centres are growing in our country however for optimum usage of the available centres, it's miles significant to generate idea cognizance. Now a day, shortage of know-how approximately the big capacity to be profit from the garage of CBSC and particularly system nature is the solution purpose for a client bottom inside the USA. The nursing staff are the only person who have in continuous contact with the expectant lady and accompany throughout her pregnancy process. The whole responsible of providing information and encouraging the mother is in the hand of nurses. They are the key role holder in any hospital set up in carrying out the procedures. However there is always some kind of misunderstood or not
proper being communicated to the provider that the approach from the lady towards UCB to donate is lacking. Health personnel needs to upgrade their knowledge on such issues so as to inculcate the same to the public.

For the want of therapeutics remedy within the future existence, these days couples have the selection to donate or to privately economic institution their baby’s UCB to be used. It is multi-factorial and arguably extensively stimulated with the aid of the ones disturbing for them at some stage in the antenatal duration for the parents to return up and make this option. In this content material gives a communicate concerning UCB evaluation of posted imaginary tale to the women. UCBB is the manner of accumulating and storing UCB, in the immediately period after the transport of a child.

CB of MSCs which show outstanding ability for use in plenty of remedies. It shows a possibility to BM for remedy of any blood disorders, resistant problem etc due to wealthy resource of HSCs for the reason that 25 years. There are numerous scientific trials taken study on the advantage of hematopoietic and MSCs for many neuro, immune problems. As an outcome, CB banking is a fast observable fact, with increasingly UCB devices being accumulated and saved. The primary public CB monetary institution opened inside the huge apple in 1993. Presently, an global community of many public wire blood banks in so many locations. Personal CB banking has had the maximum rapid upward mind in uptake.

Fifty 4 international locations, many private bank have been installed and advertising offerings to a in addition 35 worldwide locations. Over 1,000,000 twine blood devices were open for individual use and the increase fee can expected to be less % in keeping with annum. Considering the truth that 2008, many non-public banks additionally collect and maintain wire tissue. The banks collect, approach, take a look at, inventory up and launch CB given for the own utilization for the family members, for free of charge to the donating parents. Genetically matched cells from some different character given by others are generally used for allogenic transplants. Donors may additionally or won’t be associated with the recipient.

Private UCB banks price a fee to acquire, technique and keep an baby’s CB for autologous or allogenic circle of relatives use Across the world, research are carrying out on this aspects in order to expertise and perceptions
of wire blood banking. So that, they can be use on treatment for stem cells. An increasing amount of expectant dad and mom are in search of statistics from their antenatal care company approximately CB banking alternatives, or asking for their support in personal CB collection. Outcomes from a couple of research have discovered that most of the people wants to acquire facts on CB from their health personnel. The businesses have an crucial feature in offering correct, independent, evidence-based totally information approximately bank for cord blood choice to help couples. A few worldwide places have stated this vital role with the useful resource of introducing regulations which recommends or calls for specialists to tell mother and father in their options concerning CB renovation. But it's been optional that CB banks operate own are commonly the primary training resources about this for medical specialists, which include OBG person who will increase ethical problems approximately the nice of independent facts in the long run imparted to mother and father.

In the medical field, midwifery and staff nurses are key provider of fitness care in all degrees of society needs. Their role on this aspect is collection of UC blood, tube labelling, and packaging. Therefore, nurses must be informed and conscious of new developments in diagnosis and remedy. Therefore, nurses want to be knowledgeable concerning the price of amassing and maintaining UCBSs for destiny draw on in treating illnesses. Extended level of focus regarding umbilical cord stem cellular remedy among the healthcare carriers, mainly the group of workers nurses will help in bringing this concepts a critical part of Indian health needs. Consequently, there is a need to evaluate the understanding of workforce nurses regarding SC therapy and broaden self-educational module to improve the information of group of workers nurses regarding UCB stem cell collection, upkeep and usage.

Midwifery require to apprehend SC resources for you to be ready to open up the problems. Nurses need to furnish ones profession with correct records, the usage of the proper principles and guidelines following the procedures. So that, each one of us are able to decide and become an important information provider to help the medical to take step forward. The gathering of CB is frequently executed by way of all the medical team who will
be involved to carry out and had obtained schooling. The gathering of CB happens after the shipping of toddler and does no longer purpose any sort of damage to the toddler or mom. No considerable threat from collecting CB should not be by force or treated to the couples. The only feasible chance recognized in the narrative is too fast in tighten the UC might also augment the hazard of baby anaemia. Blood have to be universally amassed from each vessels, arterial and venous blood, before placental transport by way of umbilical vein puncture performed once the baby and placenta delivered.

Normally familiar techniques in accumulating blood from cord following shipping of the new child infant. Numerous studies have as compared CB units accumulated by way of using each techniques, and, in mixture, they do not exhibit constant or massive variations in standard blood extent. So it is to gather the blood straight away after shipping preceding to placental separation from the placenta. Thereafter the collection process begins and being transported. The crucial problems in acquiring immoderate- satisfactory units for transplantation are maximizing the quantity of blood collected, averting any form of infection, and heading off undue delays that could bring about clot formation in the blood.

However studies on the knowledge and practice among health professionals are less and the previous studies have mainly deal with the education programme on placental stem cell and cord bank banking. Very few studies have been conducted in the areas of knowledge and practice about placental stem cell collection among health professionals in India. Interventional studies among health professional are rare. The above facts created an interest in the investigator’s mind to find the knowledge and practice of health professional on PSC and its utilization among Health professionals. The present study also provide a SIM on effective methods of PSC collection. This offer direction to the health professionals, enhance their efficiency and skill in collecting the placental stem cell and thereby increasing the quality in performing the procedure so as to have effective usage of placental stem cell.
1.2 Problem on Hand
knowledge and practice about placental stem cell and its utilization among various health professionals in selected hospitals, Bangalore, Karnataka.

1.3 Research Aim
1. To assess the knowledge about placental stem cell and its utilization among various health professional.
2. To assess the practice about placental stem cell and its utilization among various health professional.
3. To determine the relation between the knowledge and practice score regarding placental stem cell and its utilization.
4. To find the association between knowledge and practice and demographic variables.
5. To prepare a self-instructional module on effective methods in collecting the placental stem cell.

1.4 Scope of research work
The researcher realize the importance of SC and its therapy and with this investigate work, researcher enlighten more to improve the skill in collecting the placental stem cell. With this research work, the knowledge and practice of the health professionals should improve and thereby expand the utilization of placental stem cell among public.

The scope of this research work are
- The present study would highlight the importance of skill in performing the procedure of placental stem cell collection.
- The study findings would provide guidance to the nursing leaders, educators and administrators to include components of placental stem cell in the syllabus and develop packages for nursing personnel, in order to provide education and training in the core issues of placental stem cell.
- The study would facilitate the health professionals that there is a need to undergo training before performing procedure of placental stem cell collection as to have effectiveness in doing the procedure.
- The study would enable the health professionals to gain insight into the importance of providing proper guidance and counselling to the expectant couples to plan for stem cell donation.
The study would bring out the awareness to the public about the importance of placental stem cell and its utilization.

The study would be useful for the expectant couples to know the treatment regime out of placental stem cell and also the availability of donation centre both in public and private.

The study would provide direction for future research in India to take up similar studies with larger samples with training program, and longer follow up periods and in different setting such as comparing the public and private set up.

The most importance scope and significance of this study is that in the recent science the advancement of the stem cell therapy an transplantation has made a miracle in the treatment of many diseases. Even though the usefulness of umbilical and placental stem cell is known to all, still it is taken into consideration as a clinical waste and disposed following after the delivery of the child. There is always a lack of knowledge about the usefulness and application of the placenta presently. Further, as the investigator working in the clinical set up and coaching knowledge, discovered that the skill in performing the methods isn't always completed well and there may be poor understanding and poor mind-set regarding UCB concept and the mainly of SCs in midwifery. Consequently, it's far of the essence to lift up staffs information about recent problems of CB collection and SCs. This examine is performed to get better among nurses understanding or exercise concerning placental and CB collection and its utilization by way of making use of an academic intervention.

1.6 HYPOTHESES

Research Hypotheses:

"Hypothesis is the main tool for conducting the research. The function is to bring out the new experiment and observation. It is a statement that predict the relation between the variables under the study. Thus testing make probability statements about population parameters, it cannot be proved everything but in practice it is allow in case of critical test. It is based on the objectives /aim of study. Before hypothesis is tested through many ways ,it is
better to understand the testing technique which is going to used." (Kothari CR, 2004, P 184)

It is a formal question that intend to solve and get the value. For a researcher it is very important to have a prediction about the study, should be able to test following systematic and logical approach. And the variables have to be connected with each other.

In this study it included only study variables and demographic.

**The stated are for the present study**

H$_1$: There will be significant correlation between knowledge and practice about placental stem cell and its utilization among health professionals.

H$_2$: There will be association between knowledge scores and age

H$_3$: There is significant association between knowledge scores and gender

H$_4$: There will be significant association between knowledge scores and professional qualification

H$_5$: There will be significant association between knowledge scores and work experience.

H$_6$: There will be significant association between knowledge scores and source of information

H$_7$: There will be significant association between knowledge scores and previous experience

H$_8$: There will be significant association between practice scores and age

H$_9$: There will be significant association between practice scores and gender

H$_{10}$: There will be significant association between practice scores and qualification

H$_{11}$: There will be significant association between practice scores and work experience.

H$_{12}$: There will be significant association between practice scores and source of information

H$_{13}$: There will be significant association between practice scores and previous experience

H$_{14}$: There will be significant difference between knowledge among health professionals over their selected demographic variables regarding placental stem cell and utilization.
$H_{15}$: There will be significant difference between practice regarding placental stem cell and utilization among health professionals over their selected demographic variables.

**NULL HYPOTHESES**

Otherwise called as alternative hypothesis. It has to be chosen before the sample is selected. It represent the hypothesis which can be rejected and also find out all other possibilities. Null hypothesis should always be specific. Hence the use of null hypothesis is quite frequent. *(Kothari CR, 2004)*

According to Polit and Hungler (1999) expressed that the invalid speculation is an announcement that there is no genuine connection amongst factors and that any such watched relationship is just a component of possibility, or inspecting vacillations. The requirement for invalid theory lies in the way that measurable speculation testing is essentially a procedure of dismissal.

It is conceivable to demonstrate that the invalid speculation has a high likelihood of being erroneous, and such proof loans support to the logical theory. The dismissal of invalid theory, at that point, is the thing that the specialist tries to achieve through measurable tests.

**Thus the following are included as null hypothesis:**

- $H_{01}$: No significant correlation between knowledge and practice about placental stem cell and its utilization among health professionals.
- $H_{02}$: No significant association between knowledge scores and age
- $H_{03}$: No significant association between knowledge scores and gender
- $H_{04}$: No significant association between knowledge scores and professional qualification
- $H_{05}$: No significant association between knowledge scores and work experience.
- $H_{06}$: There will be no significant association between knowledge scores and source of information
- $H_{07}$: There will be no significant association between knowledge scores and previous experience
H₀₈: There will be no significant association between practice scores and age
H₀₉: There will be no significant association between practice scores and gender
H₀₁₀: There will be no significant association between practice scores and qualification
H₀₁₁: There will be no significant association between practice scores and work experience.
H₀₁₂: There will be no significant association between practice scores and source of information
H₀₁₃: There will be no significant association between practice scores and previous experience
H₀₁₄: There will be no significant difference between knowledge among health professionals over their selected demographic variables regarding placental stem cell and utilization.
H₀₁₅: There will be no significant difference between practice regarding placental stem cell and utilization among health professionals over their selected demographic variables.

VARIABLES:

1. Study variables:
The variables in the study are knowledge and practice

2. Demographic variables:
includes the socio demographic characteristics of health professional like

A. Age in years
• 21-25
• 26-30
• 31-35
• 35 and above

B. Gender
• Female
• male

C. Professional qualification
• GNM
• B.SC
• PB.BSC
• Lab Assistant

D. Work experience (in years)
• 5
• 10
• 15

E. Previous knowledge about placental stem cell collection
• No
• Yes

F. If yes, Source of information
• Media
• Family
• Friends
• Continuing nursing education

ASSUMPTIONS:
Assumption are the beliefs that are held to be fact but have not necessarily been proven; It can be of two types explicit or implicit. The fundamental opinion is accepting as mortal correct by a judgment or rationale, not lacking evidence or authentication. This is not like hypothesis, it does not need any testing. Moreover, some researcher will not include assumption at all in the study and few will have in their research. (Raj D.E.B,2014)

Few assumptions are as follows:
➢ Health professionals may have lack in knowledge regarding placental stem cell
➢ Health professionals may not be skill in performing the procedures of placental stem cell collection.
➢ Health professionals may not undergo any training before they practice the collection of placental stem cell.
Many training programs are available to have an effective collection of placental stem cell.

Effective methods of collecting placental stem cell will save the time and will be able used efficiently for the treatment.

Health professionals may not be aware of the private and the public banking system of placental and cord stem cell.

Health professionals may be unaware about the current scenario of the placental stem cell.

**DELIMITATIONS**

They are those characteristics that limit the expansion and scope of the study. Through this the researcher try to narrow down the problem. And also bounds that researcher impose prior to the starting of work and are under the control. It is actively selected based on the research problem, objectives, variables, populations and methods of analysis based on result how the interpretation should be. It is very important necessary as they signify the limitations of the study. *(Raj D.E.B, 2014)*

- Health professionals working in the selected hospitals.
- Health professionals who are able to communicate in English or Hindi or kannada.
- Health professionals who are interested to be in the study.
- Experience health professional trained in collecting placental stem cell.
- Present during study time.

**OPERATIONAL DEFINITIONS**

**Assess:** Refers to the organized systematic process of collecting information about knowledge and practice from health professionals regarding placental stem cell.

**Knowledge:** In this study it is the suitable reaction received from the health professionals to the things elicited through a structured knowledge and practice questionnaire.
Practice: Here it is a definite appliance or apply of an plan or methods as disparate to theory describing to it.

Placental stem cell: here it means the forms of perinatal SCs derives from placenta and UCB or tissue.

Utilization: Refers to the action of making practical and effective use of something.

Health professionals: Refers to all registered GNM, BSc, Post BSc nurses and laboratory assistants who are working in the Hospitals.

Self Instructional Module: the information booklet on the effective methods to collect the placental stem cells.

THEORITICAL FRAMEWORK

Conceptual framework are as comparable with theories. It give an explanation for approximately phenomenon of interests, expresses assumptions and displays a philosophical stance. It is range in their stage of abstraction and in the breath of phenomenon they provide an explanation for, provide an ordinary image of the phenomenon they cope with. Conceptual fashions are not testable through studies. It can be used because the same or the similar terms as those of different fashions however outline them in different approaches.

A structure is a quick clarification of the concept or the ones portions of a idea which can be to be examined in a qualitative examine. Theoretical and conceptual frameworks are usually used inside the quantitative research, which assist to arrange the study and offer a context for the translation of the study's findings. They are used interchangeably however simply they're distinct.

To construct a theoretical framework, an current concept is used to set up the connection between the observe ideas. The frame for concepts is a well defined of interrelated main beliefs that depicts a bit of concept to be explained as the idea from studies research. Those are the muse that courses the studies. It gift a broad, preferred rationalization of the connection among the principles of the studies take a look at, based on an current theory. While conceptual framework presents logically built principles to provide standard clarification of the relationship most of the standards of the research study
without the usage of a single current idea. Conceptual framework are typically constructed through the use of researchers personal studies, previous studies findings, or concepts of numerous theories or models.

Construction of a framework requires researchers knowledge of theories, findings of the previous similar research studies and related field experience. It requires skill of creativity in identifying and establishing the study concepts and their relationship with each other to provide foundation for theory testing or theory developmental research.

**Facts about the framework development are:**
1. Improvement of a framework relies upon at the power of remark, knowledge of a trouble, imagination and conceptualization approximately summary thoughts and ability of linking the summary ideas with logical scheme to generalize the information.
2. Framework are commonly develop through inductive reasoning, where the researcher has the capacity to examine and conceptualize to generalize the information. It can be inductive reasoning or deductive reasoning of the ideas.

**Sources of concepts to develop conceptual framework**
- to broaden a framework, concepts can be borrowed from private actual lifestyles revel in, findings of the preceding studies and ideas of current theories or theoretical fashions.
- a theoretical framework is advanced on the idea of theoretical standards associated with particular studies take a look at variables.
- They are constructed on the premise of the researchers on experience in respective subject and findings of the preceding have a look at or the ideas of the numerous existing theories.

**Steps of developing conceptual framework**
- Conceptual of theoretical framework of the study may be developed by using following steps:
Identification of the general concepts: the researcher identifies the general concepts of the study, these concepts may be based on study variables.

Gathering of the relevant information: This step involves the getting of the information about the concepts from the relevant existing theories, previous research findings etc.

System of widespread scheme of applicable concepts: the researcher starts off evolved setting up the overall courting among the exceptional associated and relevant ideas.

Development of a logical construct: once the connection among the variables are done, the researcher increases a final construct. Assemble in a relatively abstract, complex description of the phenomenon.

Evaluation and revision: concepts and construct acts as a building blocks for the framework of the research design.

Establishing of the congruity: Once a researcher develops a framework, it is important to establish the congruity between the conceptual model and its components, the research problem, hypothesis, description of the operationalization of the concepts and the selection of the research design will be done.

The theoretical framework for this research is obtained from modified goal attainment theory created by one of the famous nursing personality Imogene King developed a concrete work relating 3 interrelated systems.

They are
- personal
- Interpersonal
- Social system

After an extensive search, the investigator found that King's goal attainment is best suited to formulate conceptual framework for the study and it is put in the fig 1.

Every man or woman is a personal system. The smallest stage is personal systems, produced from individuals. Perception is supplied as the
principal concepts of a personal system, this influence all behaviors or to which all other standards are associated. The principle characteristics of the notion is generic or experienced via all, subjective or personal and selective for anybody. Notion is action oriented inside the gift and based totally on the information this is to be had. Belief is transactions this is an person are active members in conditions and their identities are tormented by their participation. King similarly discusses belief as a manner where information received in the course of the senses and from reminiscence are prepared, explained and distorted. This manner of human interaction with the environments impacts behavior, affords that means to experience and represents the character picture of truth.

The traits of self are a dynamic individual, an open machine and purpose orientation. The self is a composite of mind and feeling which represent a person's attention of his character enjoy, his conception of the identity.

Growth and development consists of cell, molecular and behavioral adjustments in individual. Body image is characterized as familiar due to the fact all and sundry have a few ideas of it. It any be a personal or subjective to the man or woman. Space is characterized as conventional due to the fact anybody have a few concepts of it. It could be personal. Time is characterized as general or inherent in lifestyles processors, relational or depending on distance and the amount of information taking place, unidirectional of activities, measurable and subjective.

The second one is interpersonal systems or companies. These are normally small groups. It's miles shaped by way of man or women interplay. Interacting individuals form a small or a large agencies. The relevant principles for the interpersonal machine are interplay, verbal exchange, transaction, role and stress. The major principles, interplay is characterized by using values mechanism for establishing human relationships being universally experienced by means of a communication. Interplay is characterized by values mechanism for organizing human relationships, being universally skilled, being prompted by perceptions, reciprocity. Interplay is the observable behaviors of or more persons in mutual presence. Communication are the verbal or non verbal interplay among the humans.
Transactions are derived from the cognition and perceptions and no longer from transactional evaluation. Task include reciprocity among a person at one given time or at all over again. Strain is a dynamic and occur due to open gadget being in continuous trade with the environment.

The standards of interpersonal systems are interaction, conversation, transaction, position and stress. The focal point of nursing inside the interpersonal gadget is the surroundings. Interpersonal system join together to shape larger device referred to as social device. The main standards interplay is characterized as values mechanism for establishing human courting being universally experienced, being influenced by using perceptions, reciprocal, both verbal and non-verbal communication. Conversation is a transaction of records either written or oral. Transaction are derived from the cognition and perception and not from transactional evaluation. The transaction are specific due to the fact every character has a private world of truth based totally on that individual perceptions. Function include reciprocity in that a person can be a giver at one time and a taker at once more, with a dating among two or more individuals who are functioning in or greater roles which might be learned, social, complicated and situational in nature. Pressure is a dynamic end result of open system being in non-stop exchange with the surroundings, the depth varies, there's a reaction to life activities this is specific.

The most important systems are social systems. It comprised of an prepared boundary gadget of communal function, performance and skill evolved to keep principles, methods to alter the whole concept of terms and conditions. The essential concept company within the idea is characterized through structure that orders positions and sports and relates formal and casual preparations of individuals and groups to achieve private and organizational desires. The characteristics of authority include that it's far observable through provisions of order, steering and responsibility for actions. Strength is characterized as common, situational, essential inside the organization, constrained by using assets' in a scenario. Status is characterized as situational, position based and reversible. King defined reputation as the location of an character in a set or a collection when it
comes to other agencies in an organization and identifies that popularity is observed by privileges, duties and duties.

The theory concept is making to interact each other as co operative to outline the desires and arrive at needs which is frame by all to achieved. The essential factors of the principle of goal attainment are seen as two one of a kind individuals comes collectively who are virtually stranger come together to assist and be helped to preserve or enhance the functioning in roles. The concept ideals that among the two character there can be an interplay represented via verbal and non verbal behaviors which are intention orientated. The man or woman come together for a cause and perceive each other and make a judgment and make a aim to gain. Anybody has a representation of the truth perceive the aim. Conversation takes place in which statistics are percentage among the 2 organizations and have interaction every other to reap their goal. While transaction happens among the two agencies the intention is perceived to be accomplished.

**KING’S GOAL ATTAINMENT THEORY’S CONCEPTS**

The main principle of goal accomplishment are visible within the interpersonal structures in which 2 folks that are typically not known to each other, try to do one goal in the health care enterprise to assist and be support to keep up a country of wellbeing that allows performance in duties. The theory awareness on interpersonal systems reflects kings notion that the exercise of nursing is differentiated from that of other health profession through what nurses do with and for individuals. So the theory is mainly on total at the standards of conversation, insight, judgment, act, response, operation and comments.

These concepts are interrelated in each nursing care state of affairs. Although the time period of the king idea are simple ,it need to be underneath in the device well. King states that the best transaction has been operationally defined although all had been conceptually described.

**Communication**

King’s describe communication is something where a man exchange the message with the other person for one time seeing each other or any
others ways of communication like phone, letter, mail, etc. Conversation interpret the facts additives of interaction.

**Perception**

King’s describes perception as a representation of truth of every person. The factors of notion are the uploading of strength from the environment and organizing it by way of statistics, reworking power, processing facts, storing facts and the exporting statistics inside the shape of overt behavior.

**Judgment**

Judgment is being describes by King as a active and systemic method by using a character come collectively for a motive and understand every different, each makes a judgment and takes intellectual motion to reply or decide to act.

**Action**

Action is defined as a act or collection of conduct to the scenario. It involves a intellectual and bodily motion. The sequence is first intellectual movement to apprehend the offering situations, then physical movement to begin activities related to the ones conditions and ultimately intellectual action so that it will exert control over the situation, combined with physical action searching for to reap the desires.

**Reaction**

Reaction refers to the collection of reaction to the scenario. It isn’t always specifically defined but might be taken into consideration to be blanketed in the collection of behaviors presented by performing.

**Interaction**

It defines interplay as a course of insight and message among man or woman and surroundings and between a person and character represented via verbal and non verbal behaviors which are aim orientated in King’s concept. Every of the people concerned a interplay brought specific thoughts, action and beliefs to the change. The character come collectively for a intention and identify each different, finalized the fact, interpret intellectual motion or action to behave. Exchange of talk happens with opposite then state of affairs occurs as notion, verdict, exploit and response. He shows that most effective the interplay and outcome can be very well seen.
Transaction

Transaction means to valuation component of man communications and contain bargain, compromise and common alternate. When transaction happen within two individuals, the goal set is attained. It is definite as visible behaviors of a person being with his environment.

APPLICATION OF THEORY

The theory is totally on the philosophy of human being and open device framework. The concept of aim achievement and frame has been functional in many distinctive conditions. The application of this theory is numerous despite the years from baby care to elders to geriatric group. Also practical in diverse any medical care area like maternity unit, hospitals, day care or all setting. She represents the effects of a number of the studies work conducted to test the idea and proposes an utility of the concept within the form of a goal oriented.

Communication

The investigator provides structured questionnaire about the placental stem cell and its utilization directly to the health professionals.

Perception

The investigator perceived that the health professionals should have up to date information regarding PSC and its utilization. Health professionals needs to improve knowledge and practice on placental stem cell and its utilization.

Judgment

The researcher jury that enlistment of material is required to evaluate, enhance and educate an understanding and practice on health professionals regarding PSC and its utilization. The investigator identify the source of learning regarding methods of placental stem cell collection so as to improve in the practice of placental stem cell collection.

Action

The investigator develops the self instructional module and distribute to the respondents on effective methods in collecting the placental stem cell.
**Reaction**

Investigator assess respondents knowledge and practice on placental stem cell and its utilization and the respondents reacts by answering the structured questionnaire on knowledge and practice of placental stem cell and its utilization.

**Interaction**

The investigator administers structured questionnaire on placental stem cell and its utilization and interact with the health professionals by clarifying doubts. The self instructional module were distributed to the respondents.

**Transaction**

Transaction is in expressions of adequate increase in awareness and practice and its implication while performing the procedure to have better outcome.
FIG 1: Theoretical framework based on modified Imogene king Goal Attainment System Theory (1963) as modified
OUTLINE OF THE REPORT

The report is organized in six chapters

Chapter 1: Introduction contains introduction, need of the study, problem statement, objectives, assumptions, delimitations and operational definition.

Chapter 2: It deals with review of literature relevant to the study under heading such as studies related to the knowledge on placental stem cell collection and studies related to the practice on placental stem cell collection and its utilization.

Chapter 3: It describes the methodology of the study which include approach, design, setting, population, sample and sampling technique, data collection tools, analysis, diagrammatic presentation of the study.

Chapter 4: It presents analysis of data and interpretation.

Chapter 5: It deals with the present study findings and discussion.

Chapter 6: It present with brief summary of the findings, implications, limitations, recommendations and future scope of the study.