

A Descriptive Study to Assess the Knowledge Regarding Stem Cell Collection and Preservation among Women in Selected Urban Areas of Ahmedabad City with a view to Develop an Information Booklet.

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Abstract

A stem cell is a cell with the unique ability to develop into specialized cell types in the body. In the future they may be used to replace cells and tissues that have been damaged or lost due to disease. The present study aim to assess the knowledge regarding stem cell collection and preservation among 75 women residing at urban areas of Ahmedabad city with a view to develop an information booklet. The research design adopted for this study was Non experimental descriptive research design and non-probability convenient sampling technique was used for data collection. The study was conducted in urban areas of different societies of Ahmedabad city. Data collection tool consist of semi structured knowledge questionnaire with multiple choice questions. Data was analyzed through descriptive and inferential statistics. The study revealed that 17.33% samples had good knowledge, 73.33% samples had average knowledge and 9.33% had poor knowledge. Mean score regarding stem cell collection and preservation was 22.73. Among demographic variable Age in years, Education of women, Occupation of women, Marital Status, No. of children, Monthly Income, Religion, Source of information, Have they ever stored their Stem cells, it was found that there was significant association between occupation of women and knowledge of women. Chi square value was 8.171 and calculated P value was 0.016 which was less than 0.05 which indicated that it was significant. After analysis the investigator developed and distributed an information booklet regarding stem cell collection and preservation.

Keywords: Stem Cell Collection and Preservation; Umbilical cord blood; Cord blood Transplants.

Introduction

Cells are the basic unit of life. In the modern world, they are the smallest known world that performs all of life's functions. All living organisms are either single cells, or are multicellular organisms composed

of many cells working together.¹ Our body is made up of many different types of cell. Most cells are specialized to perform particular functions, such as red blood cells, that carry oxygen around our bodies in the blood, but they are unable to divide. A stem

cell is a cell with the unique ability to develop into specialized cell types in the body. In the future they may be used to replace cells and tissues that have been damaged or lost due to disease. They have two unique properties that they can divide over and over again to produce new cells. As they divide, they can change into the other types of cell that make up the body. Stem cell research is looking to better understand the properties of stem cells so that we can understand how our bodies grow and develop and find ways of using stem cells to replace cells or tissues that have been damaged or lost.²

Embryonic stem cells supply new cells for an embryo as it grows and develops into a baby. These stem cells are said to be pluripotent, which means they can change into any cell in the body. Cells, tissues and organs can sometimes be permanently damaged or lost by disease, injury and genetic conditions. Stem cells may be one way of generating new cells that can then be transplanted into the body to replace those that are damaged or lost. Age-related macular degeneration (AMD) is an example of a disease where stem cells could be used as a new form of treatment in the future. Some people with age-related macular degeneration lose their sight because cells in the retina of the eye called retinal pigment epithelium (RPE) cells stop working. Scientists are using induced pluripotent stem cells to produce new retinal pigment epithelium (RPE) cells in the lab that can then be put into a patient's eye to replace the damaged cells. Currently, damaged organs can be replaced by obtaining healthy organs from a donor; however donated organs may be 'rejected' by the body as the immune system sees it as something that is foreign. Induced pluripotent stem cells generated from the patient themselves could be used to grow new organs that would have a lower risk of being rejected.²

The umbilical cord blood contains hematopoietic stem cells - similar to those found in the bone marrow - and which can be used to generate red blood cells and cells of the immune system. Cord blood stem cells are currently used to treat a range of blood disorders and immune system conditions such as leukemia, anemia and autoimmune diseases. These stem cells are used largely in the treatment of children but have also started being used in adults following chemotherapy treatment.³

Umbilical cord blood (UCB), a once discarded material, has shown both in the lab and clinically to circumvent a number of these BM transplantation complexities. UCB cell transplantation made its clinical debut in 1988 when it was used to successfully treat a 5-year-old child afflicted with Fanconi anemia. Subsequently, more than 6,000 UCB transplants have

been performed worldwide, many of them with unrelated donors.⁴ Early efforts to use cord blood transplant (CBT) in adults led to mortality rates of about 50%, due somewhat to the procedure being done in very sick people, but perhaps also due to slow development of immune cells from the transplant. By 2013, 30,000 CBT procedures had been performed and banks held about 600,000 units of cord blood.⁵ Umbilical cord blood (UCB) banking have become a new obstetrical trend. It offers expectant parents a biological insurance policy that can be used in the event of a child or family member's life-threatening illness and puts patients in a position of control over their own treatment options.⁴

Today there are more than 450 active cord blood banks worldwide.¹⁴ The first unrelated UCB bank was started at the New York Blood Center in 1992. With India's booming birth rate of 26 million births per year 30 and genetic diversity; the country would be poised to be the largest collector of UCB in the world. Three public banks are established in India- Relicord, Jeevan Cord and Stemcyte, collectively having 5,000 units. Similarly, seven private banks have been established to date. These are Life Cell with maximum inventory of 19,000 followed by Cryo Banks having 17,000 plus samples and about 4,500 between Cryosave, Cord Life, Baby Cell, Stem One and ISSL (International Stem Cell Service) (personal communication from Dr Phagun Shah, Medical Advisor, Cryobank, India).⁹

Need of the study

Umbilical cord blood is the blood that remains in the umbilical cord and placenta post-delivery. At or near term, there is a maternal-fetal transfer of cells to boost the immune systems of both the mother and baby in preparation for labor. This makes cord blood at the time of delivery a rich source of stem cells and other cells of the immune system. Cord blood banking is the process of collecting the cord blood and extracting and cryogenically freezing its stem cells and other cells of the immune system for potential future medical use. Cord blood taken from a baby's umbilical cord is always a perfect match for the baby. In addition, immediate family members are more likely to also be a match for the banked cord blood. Siblings have a 25 % chance of being a perfect match and a 50 % chance of being a partial match. Parents, who each provide half the markers, used in matching, have a 100% chance of being a partial match. Even aunts, uncles, grandparents and other extended family members have a higher probability of being a match and could possibly benefit from the banked cord blood.⁶

7th Annual Conference on Stem Cell and Regenerative Medicine based on the theme “Advanced Approaches in Stem Cell and Regenerative Medicine” which included many research topics like Stem Cell Therapy, Stem cell & Regenerative Market, Tumor Cell Science, where highly affiliated Speakers like Nilanjana Maulik, Barritault Denis, Y James Kang, Hazem Barmada, etc.¹¹ Stem cells are already in use to cure ailments like acute leukemia, chronic leukemia, myelodysplastic syndromes, stem cell disorders, myeloproliferative disorders, lymphoproliferative disorders, phagocyte disorders, inherited disorders like osteoporosis, B-Thalassemia, inherited metabolic disorders, inherited erythrocyte abnormalities like Beta Thalassemia and Sickle cell disease, and other malignancies like multiple myeloma, plasma cell leukemia, renal cell carcinoma and retinoblastoma.⁷

In light of pioneering findings in the 1980s and an estimation of more than 130 million global annual births, umbilical cord blood (UCB) is considered to be the most plentiful reservoir of cells and to have regenerative potential for many clinical applications. A variety of UCB banks have been created worldwide in order to appropriately preserve donated units. Initially, blood services were run by hospitals or non-profit institutions, which processed umbilical cord blood (UCB) samples and provided cells when needed. Accredited ‘public’ UCB banks were subsequently linked to national registries, which in turn were linked to international inventories. This coordination has favored the identification of the most suitable sample for each patient who requires a transplant.¹³

With the emergence of stem cell collection and preservation, a former waste product of birth has been transformed into valuable, lifesaving resources. Women having unique opportunity to help or educate expected mother about their options regarding stem cell collection and preservation. Families should be educated about their options atleast three months before delivery so they can make an informed decision about their babies cord blood stem cell. The above facts created an interest in investigator’s mind to conduct a study to assess the knowledge of women on stem cell collection and preservation and develop information booklet regarding stem cell collection and preservation. Thus this study enhances the knowledge of women regarding stem cell collection and preservation.

Objective of the study

- Assess the existing knowledge regarding the stem cell collection and preservation among

women in selected urban areas of Ahmedabad city.

- Find out the association between the knowledge score of stem cell collection and preservation among women with selected demographic variables.
- Develop and distribute the information booklet regarding stem cell collection and preservation.

Assumption of the study

Women in urban areas of Ahmedabad city may have knowledge regarding stem cell collection and preservation.

An informative booklet May be useful source to improve the knowledge of women regarding stem cell collection and preservation.

Variables of study: Demographic variables: age in year, education of women, occupation of women, marital status, number of children, Family income per month in rupees, religion, source of information and have they ever stored stem cells. Dependent variable: knowledge of women in selected urban areas of Ahmedabad city, Gujarat state.

Research approach: Non- Experimental Descriptive approach was used in this study.

Research design: Non experimental, descriptive survey research design was used to get information from the sample and find out their knowledge.

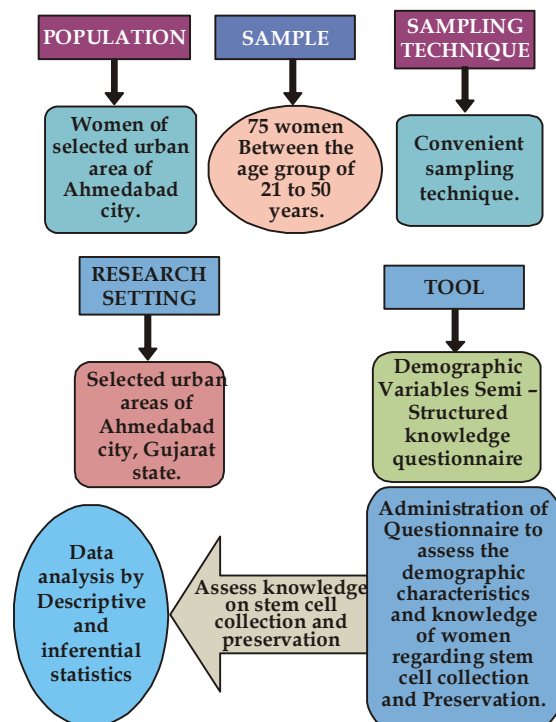


Fig. 2: Schematic Representation of Research Study.

Research setting: The present study was conducted in the selected urban areas of Ahmedabad city, Gujarat state. The selected area (Umiya park society) for pilot study was selected conveniently by investigator. Study was conducted successfully.

Target population: In this study the target population consists of women residing in urban areas of Ahmedabad city, Gujarat state.

Accessible population: In this study accessible population consist of women's in selected urban areas who were willing to participate in study and who met the inclusion and exclusion criteria of study.

Inclusion/Exclusion criteria for sample selection

Inclusion Criteria

1. Women's who are willing to participate in the study.
2. Women's who are available during the period of data collection.
3. Women's who are able to communicate in Gujarati, Hindi, English.

Exclusion Criteria

1. Who are not willing to participate in the study.
2. Who are not available during the period of data collection.
3. Who do not know Gujarati, Hindi or English.

Sample Size and Sampling Technique:

The samples who met the criteria for sampling selection were selected. The number of samples selected from urban areas of Ahmedabad city as follow:

4 Table-Total Number of Sample Selected from Urban Areas of Ahmedabad City.

Name of society	Total number of women in each society	Total number of sample selected in each society
Ghanshyam Apartment	200	25
Shyam Apartment	100	25
Goverdhan Enclave	100	25
Total	400	75

From one selected society the investigator made sampling frame that consisted of women (whose age group 21 to 50 years and willing to participate). Samples were selected with the help of convenient sampling technique, the investigator selected 75 samples. From each society the investigator, selected 25 samples who met the criteria for sample selection.

Selection of tool for data collection: A Semi-structured Knowledge Questionnaire, with multiple choice questions were used for assessing Knowledge on stem cell collection and preservation among women's in se-

lected urban areas of Ahmedabad city, Gujarat state.

Description of the Tool

The investigator prepared tool in two sections as follows, Semi Structured Knowledge Questionnaires.

Section I-Consists of Demographic variables of the samples such as age in year, education of women, occupation of women, marital status, number of children, Family income per month in rupees, religion, source of information and have they ever stored stem cells.

Section II- Comprised items on semi structured knowledge question regarding knowledge of stem cell collection and preservation Consist of 40 items each item carry one mark. Maximum score of the questionnaire is 40. Investigator gives 1 mark for correct answer and 0 marks for wrong answer. This question related to definition, Structure and function, sources, methods of stem cell collection, uses of stem cells, type of stem cell banking, it's method of preservation and benefits of stem cell collection and preservation among women in selected urban areas of Ahmedabad city, Gujarat state.

Blue print on areas, number of item and level of knowledge on semi structured knowledge questionnaire for sample.

Content Areas	Areas Level of knowledge Domain			Maimum score	Percentage (%)
	Know- ledge	Compre- hension	Appli- cation		
	Item No.	Item No.	Item No.		
Definition	1, 2	-	-	2	5%
Structure and function	3, 6, 9	5, 8	4, 7	7	17.5%
Sources	11, 12, 13, 14	-	10	5	12.5%
Method of collection	15, 16, 17, 18	19		5	12.5%
Uses	-	-	20, 21, 22	3	7.5%
Type of bank	23, 24, 25, 27	-	26	5	12.5%
Preservation	29, 30, 33, 35, 36	34	28, 31, 32	9	22.5%
Benefits	39	37	38,40	4	10%
Total	23	5	12	40	
Percentage	57.5%	12.5%	30%	-	100%

Validity: The content of data collection was send for its validity in terms of relevance and accuracy to a list of experts along with scoring sheet. The tool validation was done by the 17 nursing experts.

Reliability

The reliability of semi structured knowledge questionnaire determined by test retest method. The reliability of semi structured knowledge questionnaires was 0.634 which is more than 0.5, hence the questionnaires was determined by Cronbach’s alpha formula found to be reliable.

Analysis and Interpretation

Frequency and Percentage Distribution of Samples according to as age in years, education, occupation,

Variable	Frequency	Percentage
Age (Years)		
21 to 30	32	42.7%
31 to 40	23	30.7%
41 to 50	20	26.6%
Education		
Primary and secondary	15	20%
Higher secondary	16	21.3%
Diploma	22	29.3%
Graduate and above	22	29.3%
Occupation of Women		
Working	34	45.3%
Non-working	41	54.7%
Marrital Status		
Married	60	80%
Unmarried	13	17.3%
Divorced	1	1.3%
Widow	1	1.3%
No. of Children		
0	15	20%
1	29	38.7%
2	25	33.3%
More than 2	6	8%
Family Income Per Month in Rupees		
<5000	3	4%
5001 - 10000	8	10.7%
10001 - 20000	28	37.3%
20001 or above	36	48%
Religion		
Hindu	75	100%
Muslim	00	00%
Christian	00	00%
Other	00	00%
Source of information for stem cell collection and preservation		
Internet	22	29.3%
Print media	14	18.7%
Peer group	16	21.3%
No information	23	30.7%
Have you ever stored your stem cell?		
Yes	00	00%
No.	75	100%

marital status, number of children, family income per month, religion, source of information and have they ever stored their stem cells.

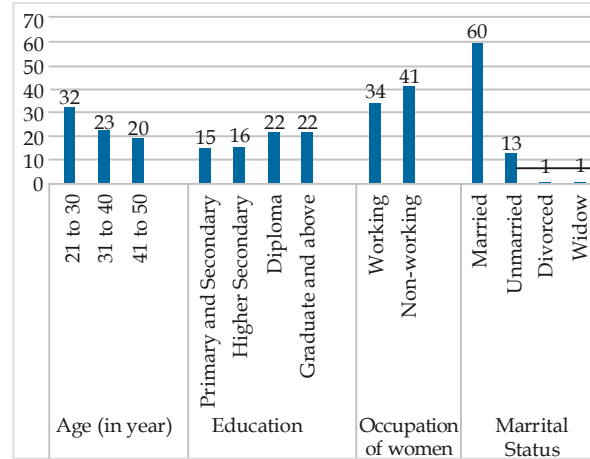


Fig. 4: Bar graph showing demographic variable age, education, occupation, marrital status.

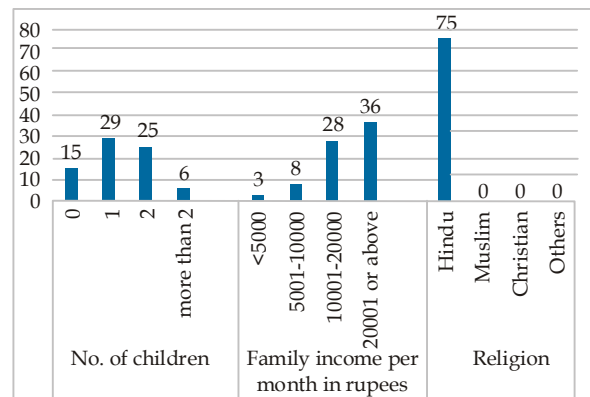


Fig. 5: Bar graph showing demographic variable no. of children, family income, religion.

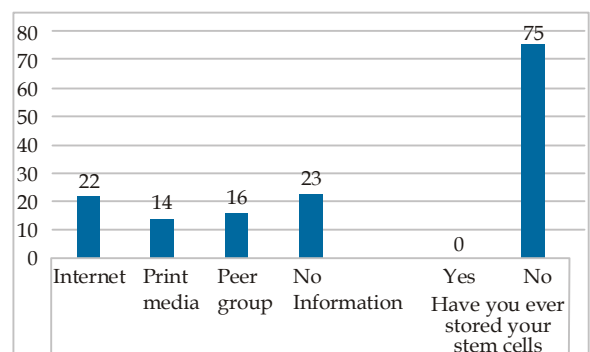


Fig. 6: Bar graph showing demographic variable source of information, have they ever store stem cells.

4.2 Analysis and Interpretation of data related to the knowledge of Samples.

Table 4.2: Showing the area wise mean score and percentage (N=75).

Area	Max. Score	Mean. Score	Percentage
Definition	2	1.50	75.33%
Structure and function	7	3.84	54.85%
Sources	5	2.52	50.4%
Method of collection	5	3.00	60.00%
Uses	3	2.00	66.66%
Type of bank	5	2.69	53.86%
Preservation	9	4.41	49.037%
Benefits	4	2.77	69.33%
Total	40	22.73	

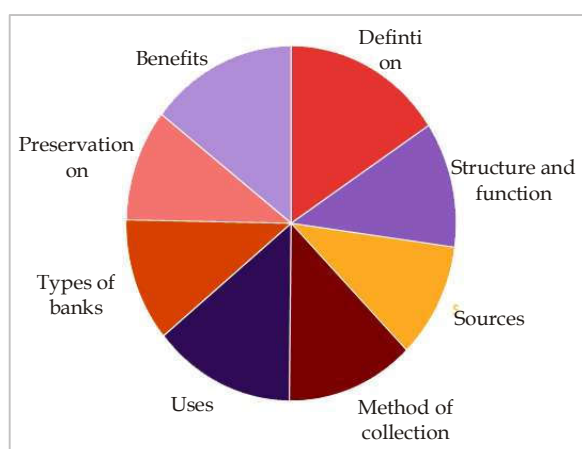


Fig. 7: Pie chart showing the area wise mean, score and percentage.

Table 4.2.1: Overall Frequency and Percentage Distribution of Knowledge Score of Samples Regarding Stem cell Collection and Preservation.

Knowledgelevel	Classification	Frequency	Percentage (%)
Good	29-40	13	17.33%
Average	14-28	55	73.33%
Poor	00-13	7	9.33%
Total	40	75	100%

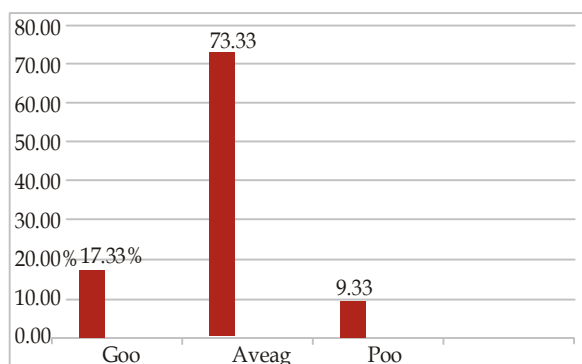


Fig. 8: Bar Graph showing over all frequency and percentage distribution of knowledge score

Analysis and Interpretation of the data selected to the association of knowledge score with selected demographic variables of the samples.

Table 4.3: Association of knowledge scores with selected demographic variables of the samples (N=75).

Demographic variable	Frequency (f)	Yates Chi Square	df	P-value	Association
Age (years)					
21 to 30	32				
31 to 40	23	8.617	4	0.0714	Not significant
41 to 50	20				
Education					
Primary & secondary	15				
Higher secondary	16	9.315	6	0.156	Not significant
Diploma	22				
Graduate and above	22				
Occupation					
Working	34	8.171	2	0.016	Significant
Non-working	41				
Marital status					
Married	60				
Unmarried	13	5.521	6	0.478	Not significant
Divorce	1				
Widow	1				
No. of Children					
0	15				
1	29	2.01	6	0.918	Not significant
2	25				
More than 2	6				
Family income per month in rupees					
<5000	3	8.757	6	0.187	Not significant
5001- 10000	8				
10001-20000	28				
20001 or above	36				
Religion					
Hindu	75	N.A.	N.A.	N.A.	N.A.
Muslim	00				
Christian	00				
Other	00				
Source of information					
Internet	22				Not significant
Print media	14	9.33	6	0.155	
Peer group	16				
No information	23				
Have you ever stored your stem cell?					
Yes	00	N.A.	N.A.	N.A.	N.A.
No	75				

Major Findings of the Study

The data were analyzed and interpreted in terms of objectives of the study. Descriptive and inferential statistics were utilized for data analysis. Data were organized and presented under the following manner: analysis and interpretation of demographic data of samples, knowledge of samples regarding stem cell collection and preservation.

According to age the data shows that out of 75 samples, 42.7% belongs to the age group of 21 to 30 years, 30.7% belongs to the age group of 31 to 40 years, 26.6% belongs to the age group of 41 to 50 years.

According to Education qualification the data shows that out of 75 samples, Primary and secondary 20%, Higher secondary 21.3% Diploma 29.3%, Graduate and above 29.3%

According to Occupation of the data shows that out of 75 samples, working 45.3%, Non-working 54.7%.

According to the data of the marital status out of 75 samples, 80% were married, 17.3% were unmarried, 1.3% were divorce, and 1.3% were widow.

According to the data of the number of children out of 75 samples, 20% belongs to no any children, 38.7% belongs to 1 child, 33.3% belongs to 2 children, 8% belongs to are having more than 2 children.

According to the data of the family income out of 75 samples, 4% belong less than 5000/- monthly income of family, 10.7% belongs to 5001 to 10000, 37.3% belongs to 10001 to 20000, 48% belongs to 20001 and above monthly family income.

According to the data of the religion out of 75 samples, 100% samples belongs to Hindu religion. 0% belongs to Muslim, Christian and other religion.

Recommendation

The following recommendation is made on basis of the present study:

1. A similar study may be replicated on a large sample, there by findings can be generalized for large population.
2. A similar study can be undertaken with experimental research design.
3. A similar study can be undertaken in different setting among women.
4. A survey can be undertaken on raise the awareness regarding stem cell collection and preservation.
5. A similar study can be conducted to compare the knowledge level between the women of different areas.

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