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## A study to assess the knowledge and attitude of nurses regarding stem cell and umbilical cord blood banking in selected hospital of Ambala, Haryana

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### Abstract

A study to assess the knowledge and attitude of nurses regarding stem cell and umbilical cord blood banking as selected hospital of Ambala, Haryana, India. The objectives of the study were to assess the knowledge and attitude of nurses regarding stem cell and umbilical cord blood banking. Also to find out the correlation between knowledge and attitude score regarding stem cell and umbilical cord blood banking and to determine the association of level of knowledge and attitude of nurses regarding stem cell and umbilical cord blood banking. The Research approach adopted for the study was quantitative research approach and it was carried out on the 170 nurses. A structured knowledge questionnaire and attitude scale (5 point Likert scale) was used to collect the data. Validity was ensured in consultation with the guide and experts reliability of knowledge questionnaire was tested by kr20(r=), for attitude scale by the cronbach alpha method.

The result of the study depicts that more than half (58%) of the nurses were in the age group of 20-25 years, majority of nurses (82%) were having qualification in G.N.M, with majority of nurses (89%) were in 1-5 years of experience, More than half of nurses (52%) having no additional information about umbilical cord blood banking required, more than half of the nurses (51%) not heard about umbilical cord blood banking, majority of the nurses(94%) having no training courses about umbilical cord blood sampling and stem cell sampling, forty three percent (43%) of nurses had average knowledge, followed by (28%) of nurses had good knowledge, (19%) of nurses had very good knowledge and only (10%) of nurses had excellent knowledge regarding stem cell umbilical cord blood banking, fifty one percent (51%) of nurses had moderate favorable attitude regarding stem cells and umbilical cord blood banking and there was significant correlation between knowledge and attitude scores as evident by 'r' value of 0.15.

**Keywords:** Knowledge, attitude, nurses regarding stem cell, umbilical cord blood banking

### Introduction

The human body is the entire structure of a human being. It is composed of much different type of cells that together create tissue and subsequently organ system. They ensure homeostasis and viability of human body. The human body consists of more than 200 mature cell types: each has a distinct and specialized function. Stem cells are different to our mature working cells, they have an amazing ability to not make more of themselves, but also to create new tissues when they divide and develop. The discovery of stem cell was one of the greatest achievements of modern medicine, The stem cells found in cord blood have the ability to divide for indefinite periods in culture and to give rise to specialized cells are the building blocks of our blood of our blood and immune system and most readily reproduce into red blood cells, white blood cells and platelets [1].

The Umbilical cord is the vital direct interlink between mother and fetus, which is always depicted as the relationship of an emotional bonding of motherhood, which is a beautiful experience for women. When mother gives birth, the blood that remains in the placenta and umbilical cord is referred as cord blood. This particular blood contains numerous hematopoietic stem cells that have the ability to differentiate into other cell and ability to self-generate [2].

Umbilical cord blood is rich in stem cells, which are the building blocks of the blood and the immune system. These biologically unique cells have the ability to develop into other cell types within the body. Cord blood as a source of Hematopoietic Stem Cell (HSC) has advantages as it is easily available; involves non-invasive collection procedure and is better

tolerated across the human leukocyte antigen barrier. Since the first cord blood transplant in 1988, over 2500 cord blood hematopoietic stem cell transplants have been done worldwide. The proliferative capacity of hematopoietic stem cell in cord blood is superior to that of cell in bone marrow or blood from adults [3].

Stem cell are found in all multicellular organisms, and are characterized by the ability to renew through mitotic cell division and differentiate into a diverse range of specialized cell types. The two broad types of mammalian stem cell are embryonic stem cells that are found in adult tissues. Cord blood stem are pluripotent, which is the ability to differentiate into not only including bone, cartilage, hepatic, pancreatic, muscle, epithelial, endothelial, and skin. Till now, approximately 8000 people worldwide have received therapies using the stem cell derived from a newborn's umbilical cord after birth. Used in medical therapies in away similar to stem cell from bone marrow, cord blood stem cell have the power to build a new blood and immune system [4].

The first UCB bank (Umbilical Cord Blood Banks) was started at the New York blood center in 1992. There are now nearly 142 public banks and at least an additional 25 private banks actively involved around the world in collecting, processing, testing and cryopreserving UCB (Umbilical Cord Blood) for potential future use as therapeutics. There are currently approximately 44 banks over the world and they are connected to the world marrow donor association. There have been over 15,000 cord blood transplants worldwide through 2009 [5].

In India, there are approximately 72000 births daily, which results in discarding 72000 umbilical cords a day. The storage of stem cell rich blood derived from this umbilical cord can prove to be the best possible insurance against life threatening diseases. Indians have high incidence of diseases like Diabetes and Heart ailments, in the treatment of which cord blood can be a godsend, the potential of these stem cells are far higher because they prevent Graft versus Host Disease [6]. Most UCB banks in India have been opened in the last few years and UCB transplantation is in its infancy, very few reports are available for application to acquired and constitutional hematological disorders. Till date, approximately 32 patients have been transplanted using related or unrelated UCB (umbilical cord blood) of these 2 patients of replaced leukemia were transplanted using mismatched sibling cord (UCB processed at life cell and cryo banks) and one died of disease relapse and other of sepsis one child was transplanted using fresh fully matched cord and the child is well 12 years on and a plastic anemia unrelated cord blood was used with TRM of 55% at Apollo, Chennai. While one patient of leukemia transplanted at Gujarat cancer and research institute (GCRI) [7].

### **Banks in India**

With India's booming birth of 26 million births per year and diversity, the country would be the largest collector of UCB in the world. There public banks are established in India-Relicord (Mumbai), Jeevan Cord (Chennai) and Stemcyte (Gujrat), collectively having 5,000 units. Similarly, seven private have been established to date. These are Cryoviva (Gurgaon), Life cell (Chennai, Gurgaon) with maximum inventory of 19,000 followed by cryo banks having 17,000 plus samples and about 4,500 between Cryo save (Banglore), Cord life (Bangal), Baby cell(Mumbai), stem one and ISSL [international stem cell service] four of these are certified by

ISO where as Lifecell and Relicordare accredited by AABB. Most of these are affiliated with or are subsidiaries of international companies [8].

The major problem faced in India is a collection of UCB (umbilical cord blood) due to high cost and comparatively less functional public banks. In addition, considering the large population with deliveries in public hospitals due to low cost, UCB (umbilical cord blood) storage in India needs increased public private partnership model where UCB (umbilical cord blood) can be made by affordable and non-affordable people as well.

At present, In India there are over 30 clinical trials that use umbilical cord stem cell therapy. These trials are approved based on the positive outcomes of the previous phases. Some of the clinical trials are focused on neurological medical conditions include Autism, cerebral palsy, spinal cord, hearing loss and hypoxic ischemic encephalopathy, autoimmune disorder such as multiple sclerosis, lupus, diabetes, rheumatoid arthritis etc, cardio repair, myocardial infarction etc, inherited disorders such as HIV, thalassemia, sickle cell, SCID etc., that require gene therapies and orthopedic disorders [9].

### **Need of the Study**

Umbilical cord blood, which contains a large number of hematopoietic stem cell, has been used successfully for allogeneic transplantation to treat a variety of pediatric genetic, hematologic and oncologic disorders. It is potential alternative when autologous or allogeneic transplantation with Human Leukocyte A antigen matched marrow is unavailable for children.

The umbilical cord was considered medical waste and disposed of following delivery along with placenta due to the lack of knowledge about its benefits and uses. In previous researcher's clinical experiences they found that there was poor knowledge and negative attitude regarding cord blood and stem cells among maternity nurses. As nurses are the vital health care providers, so it's needful to check knowledge and attitude towards the concept. Hence, it is imperative to raise nurses knowledge and attitude regarding cord blood collection and its utilization by applying an educational intervention. Studies have shown that cord blood transplants can be performed in cases that have donor and recipient is partially matched. In contrast, bone marrow graft require 8/8 matching in most cases.

Recent advances in science have demonstrated that umbilical cord blood is a rich source of stem cells, making it valuable tissue resources in the clinical field of stem cell therapy and transplantation [10].

Nurses need to understand stem cell sources so they can enter the debate on this issue. Discussion is often intense because of the different position held by scientific, religious, social and political sources, Nurses need to equip themselves with accurate information, using the international council of nursing code of ethics for nurses and their own ethical decision making processes.<sup>11</sup> They can then make decision for themselves about the efficacy of stem cell research and then become important sources of knowledge and information to help others understand and debate the direction of this scientific breakthrough. Providing UCBB(umbilical cord blood bank) requires that nurses have unique knowledge and skills, a supportive environment, adequate nursing staffing, applied policies and collaborative relationship among the team in the culture of the women's Health Hospital [12].

A study to assess the knowledge and attitude of maternity nurses regarding stem cells and cord blood collection. Study was conducted in 2014. Quasi experimental design was utilized. Total sample of 53 staff nurse were recruited in the study. Study was conducted at two setting labor unit in obstetrics department at Benha University hospital and maternity hospital at Zagaring University hospital. Tools selected were structured interviewing questionnaire and attitude scale. The results revealed that 88.7% of nurses had poor knowledge before intervention. 90.6% and 81.2% of them had good knowledge immediately and after three months of intervention respectively. As well as. Only 1.9% of the studied nurses had positive attitude toward cord blood collection and stem cell before intervention. Meanwhile, immediately and after three months of intervention the positive attitude changed to 66.0% and 69.8% [13].

A review was done to discuss the cross sectional survey on knowledge and attitude of nurses regarding stem cells and tertiary care facility was conducted in 2016. Self-developed questionnaire and attitude scale were used on 56 nurses of labor room and maternity ward of the facility. Most of nurses had good knowledge (42.86%) and neutral attitude (78.6%) with a mean knowledge and attitude score of 16.84<sub>±</sub>4.59 and 53.75<sub>±</sub>8.29 respectively. All of the nurses expressed that

they wanted to have more information regarding stem cells and UCBB. Majority (62.5%) of nurses had heard about UCBB and reported other health care workers (74.28%) as their knowledge source. There was a positive correlation between knowledge and attitude scores of nurses ( $r=0.532$ ,  $p<0.01$ ). Nurses who witnessed/assisted UCBB had significantly higher knowledge ( $p=0.01$ ) and attitude ( $p=0.0008$ ) than those who did not heard about UCBB. Attitude scores of nurses was significantly associated with their professional educational status ( $p=0.026$ ). Nurses had good knowledge and attitude regarding stem cells and UCBB.

**Methodology**

The study was exploratory descriptive in nature. The main study was conducted in Maharishi Markandeshwar institute of medical sciences and research Hospital, Ambala, Haryana. A total of 170 staff nurses who met the inclusion criteria were selected from the hospital by using convenient sampling technique. The instrument used for the study was a self structured questionnaire & likert scale to assess the attitude towards stem cell & umbilical cord blood banking. The data obtained from the study subjects were analyzed using Descriptive and inferential statistics.

**Table 1:** Frequency & percentage distribution of nurses by their selected demographic variables N=170

Sr. No.	Demographic variables	Frequency	%age
1.	Age (in years)		
	20-25	102	58
	26-30	57	35
	31-35	11	7
2.	Qualification		
	A.N.M	10	5
	G.N.M	136	82
	B.sc nursing	24	13
3.	Year of experience		
	1-5 year	149	89
	6-10 year	20	10
	10-15 year	1	1
4.	Current working job responsibility		
	Staff nurse	156	92
	In-charge	14	8
5.	Any additional information about umbilical cord blood banking required?		
	Yes	81	48
	No	89	52
6.	Have you heard about umbilical cord blood banking?		
	Yes	85	49
	No	85	51
7.	Training courses about cord blood sampling and stem cell?		
	Yes	22	6
	No	148	94
8.	Have you ever taken assisted cord blood or stem cells sampling?		
	Yes	15	13
	No	155	87

**Table 2:** Frequency & percentage distribution of nurses in term of level of knowledge N-15

Levels of knowledge score	Frequency	Percentage
Excellent (>27)	17	10
Very Good (22-26)	33	19
Good (21-18)	48	28
Average (<17)	72	43

Maximum score- 33 Minimum score-0

**Table 3:** Range, Mean, Median, Mean%, Standard deviation of knowledge score of Nurses regarding stem cells and umbilical cord blood banking. N-15

Variable	Range of score	Mean	Mean%	Median	Standard deviation
knowledge	4-30	18.25	60.83%	18	±5.74

The data presented in the table-3 depicts that mean knowledge score was 18.25 and the median score was 18 and

standard deviation of knowledge score was 5.74 and mean% was 60.83%.

**Table 4:** Frequency & percentage distribution of attitude score of nurses in term of level of attitude scale. N=15

Level of attitude score	Frequency	Percentage
Unfavorable (<55%)	6	4%
Moderately favorable (56-70%)	87	51%
Favorable (>71%)	77	45%

Maximum score=100 Minimum score=20

**Table 5:** Frequency & percentage distribution of attitude score of nurses on positively and Negative stated statements regarding stem cells and umbilical cord blood banking.

Sr. No.	Positive Statements	S	A	UN	DA	SDA
1	Collection of umbilical cord blood immediately after delivery is necessary.	112	54	3	1	0
3	Cord blood is useful for life.	54	70	23	20	3
5	Baby's cord blood should be used for different purposes.	55	72	26	10	7
7	Collection of cord blood should be used for different purposes.	49	55	29	21	16
9	Experience is required for cord blood collection.	69	65	16	16	5
11	Stem cells across matching are necessary before use.	67	66	18	9	10
13	Storage of cord blood is necessary.	62	69	28	6	5
15	It is necessary to introduce regarding cord blood collection and stem cells in nurses.	60	59	17	22	12
17	Like to attend workshops regarding cord blood collection and stem cells in nurses.	60	73	28	6	3
19	Collecting umbilical cord blood and stem cells is approved?	45	77	33	8	7
20	I am aware of the potential benefits, uses & possible harms of stem cells research.	8	33	40	51	38

Sr. No.	Negative Statement	SA	A	UN	DA	SDA
2	Cord blood is useful only for baby and his own family only.	16	42	37	47	28
4	During cord blood collection, baby is harmed.	17	26	27	45	55
6	Cord blood collection is wasting of time.	23	42	35	49	21
8	Care of mother and baby is affected by collection on cord blood.	29	62	29	35	15
10	Stem cells transplantation should be widely practiced.	35	36	37	40	22
12	Competency in stem cell knowledge is important for me as a health care provider.	33	63	31	27	16
14	There should be no more awareness program regarding stem cell.	10	31	43	59	27
16	The government should prohibit all researches regarding stem cells from embryo or aborted fetus.	33	41	23	44	29
18	The future of mankind is bright if stem cell research could be successfully conducted.	21	29	31	46	43

The coefficient of correlation between knowledge and attitude score is 0.15, which shows positive correlation between knowledge and attitude score of nurses regarding stem cells

and umbilical cord banking, this implies knowledge determine the attitude.

**Table 6:** Chi-square value showing association of level of knowledge with selected demographic variables regarding use of stem cell and umbilical cord blood banking. N=170

S. No.	Demographic Variables	Knowledge Score				X2	Df	Table Value
		Excellent	Very good	Good	Average			
1	Age in year				4.71NS	6	12.59	
	20-25	8	22	28				44
	26-30	7	9	19				22
	31-35	2	2	1				6
2	Qualification				5.76NS	6	12.59	
	A.N.M	11	25	39				61
	G.N.M	5	6	5				8
3	Year of experience				6.64NS	6	12.59	
	1-5	13	31	43				62
	6-10	4	2	4				10
	10-15	0	0	1				0
4	Any additional information				3.67NS	3	7.82	
	About umbilical cord blood banking requires?							
	Yes	14	32	43				67
5	Current working job				7.74NS	3	7.82	
	responsibility							
	Staff nurse	13	12	24				32
	Incharge	4	21	24				40
6	Have you heard about umbilical cord blood banking?				4.37NS	3	7.82	
	Yes	12	15	26				32
	No	5	18	22				40

7	Training courses about cord blood sampling and stem cell?							
	Yes	0	2	5	15	8.16*	3	7.82
	No	17	31	43	57			
8	Have you ever taken assisted cord blood or stem cell sampling?					7.14NS	3	7.82
	Yes	0	1	3	11			
	No	17	32	45	61			

Table-6 presented the chi square value showing the association of level of knowledge regarding stem cells and umbilical cord blood with selected graphic variables. The findings suggest that the computed chi square value of training courses about cord blood sampling and stem cell (8.16) was found to be statistically significant at 0.05 level revealed that level of knowledge depend on training courses about cord blood sampling and stem cells whereas age (4.71), qualification (5.76), year of experience (6.64), current working job responsibility (3.67), any additional information about umbilical cord blood banking required (7.74), heard about umbilical cord blood banking (4.37), assisted cord blood or stem cells sampling (7.14) was found to be statistically non-significant.

### Discussion

The purpose of the present study was to assess knowledge and attitude of nurses regarding stem cells and umbilical cord blood banking at selected hospitals. The findings of the present study revealed that most of the nurses had average knowledge and the majority of nurses had moderate attitude regarding stem cells and umbilical cord blood banking. Similar result has been observed in another study done in 2016 by Venugopal A, Joshi P, to assess the knowledge and attitude of nurses regarding stem cells and tertiary care facility [14]. The study shows that (42.86%) had moderate knowledge and moderate attitude (78.6%) regarding stem cells and umbilical cord blood banking. The present study revealed that the knowledge and attitude of nurses regarding stem cells and umbilical cord blood banking were moderate, but study done in 2014 by Mohammed HF, said not supported the findings that were nurses have lacked and inadequate knowledge regarding umbilical cord blood banking [15].

The correlation between knowledge and attitude in 0.15 with Similar results have been observed in another study done in 2016 by Venugopal A, Joshi P, to assess the knowledge and attitude of nurses regarding stem cells and tertiary care facility. There was a positive correlation between knowledge and attitude scores of nurses. ( $r=0.532$ ,  $p<0.01$ ) i.e. 0.15 but a study done in 2014 by LYE JL, Soon LK to assess the knowledge and attitude about stem cells and their application in medicine among nursing students not supported the findings, the correlation of the study was ( $r=0.08$ ) that was poor correlation.

### Recommendations

1. A comparative study can be conducted to assess the knowledge and attitude of health care professionals regarding stem cells and umbilical cord blood banking in selected hospitals.
2. A qualitative study can be conducted to assess the attitude of health care professionals regarding stem cells and umbilical cord blood banking.

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