

## Umbilical cord blood “How long does it last? Does it ever expire?”: A study on general population’s awareness

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### Abstract

**Introduction:** A cord blood bank is a facility which stores umbilical cord blood (UCB) for future use in treating diseases of the blood and immune systems. But it is not known how long cord blood can be stored and its cells remain viable. So, it is a big problem for the general public to go for storage and at the same time about the affordability of the unknown longevity and viability of UCB.

In the present study, we tried to know the awareness among general public about the UCB and its longevity, viability and their affordability.

**Materials and Methods:** The study was conducted in a tertiary level teaching hospitals NRI medical college and general hospital over one year period from Nov 2016 to Oct 2017, with ethical committee approval. Our study is a cross sectional study consist of 802 general public, based on questionnaire on 20 questions such as Age, sex, education, socio economic status, what is cord blood, its use, cost, longevity.

**Result:** During our study period, out of 802 general public, 513(64%) were aware of UCBB (408 educated, 105 uneducated) and 289(36%) are unaware. 284 out of 449 (56%) people had knowledge about the cord blood storage longevity, which was more than 20 years and the lowest 5 to 10 years by only 30 aware people of 65(08%).

**Conclusion:** The knowledge about, how long to store and its cost in uneducated people is poor. So local and central bodies related to health should give recommendation and guideline related to storage and usefulness to all people and health professional at grass root level.

**Keywords:** Umbilical cord blood (UCB), Hematopoietic progenitor cells (HPCs), Hematopoietic stem cells (HSCs).

### Introduction

Cord blood is a rich source of stem cells, taken from a newborn's umbilical cord shortly after birth. It can be used to treat dozens of disorders, including several forms of leukemia, lymphoma and anemia. Parents have the option to discard it, donate it or store it with a private cord blood bank. A cord blood bank is a facility which stores umbilical cord blood for future use in treating diseases of the blood and immune systems. Private cord blood banks store the blood for a fee, in the event that the family might need it in the future. It is not known how long cord blood can be stored in liquid nitrogen and its cells remain viable. The maximum storage time for cord blood stem cells is a moving target. In fact, most cord blood banks do not label the units with an expiration date, as the number is likely to change. Since cord blood banking has only been in existence for 25 years, no scientific data is available to prove cord blood stem cells can be stored for longer than that. However, scientists have reported that cryogenically preserved cells have no expiration date, and frozen cord blood possibly can be stored indefinitely. This is supported by the key fact: Cord blood stem cells are stored at or below -190 degrees Celsius, where biological activity ceases.<sup>1</sup> So now a days, the general populations idea and believe on

longevity of cord blood is not only a question but also a challenge for us.

In the present study, our aim is to find the awareness among general public about the UCB and their affordability to store by its longevity or viability.

### Materials and Methods

The study was conducted in a tertiary level teaching hospitals NRI medical college and general hospital over one year period from Nov 2016 to Oct 2017, with ethical committee approval. Our study is a cross sectional study, consist of 802 general public (attending our OPD, with some knowledge about UCB), based on questionnaire (which are in local language and easily understand by general public), on 20 questions such as age, education, socio economic status, what is cord blood, banking, its use, cost, longevity, viability, information from health care provider and from other sources (Internate, book, advertisement). All the question were prepared from the previous studies, and with the help blood bank health professional.

**Inclusion Criteria:** 1. General public other than health professional.

**Exclusion Criteria:** 1. Health Professional, Statistical  
**Analysis:** Results are tabulated and analyzed based on chi-square test.

## Results

During our study period, 802 general public who attended OP clinic were questioned using questionnaire with total question of 20 prepared by us from the

previous studies (Dennis 2012, Broxmeyer 2011) and with the help blood bank health professional).

**Table 1: Distribution of population according to awareness**

General population (n= 802)	Aware (n=513)	Unaware (n=289)
Educated (n= 410)	408	2
Uneducated ( n= 392)	105	287
Population in %	54%	36%

Out of 802 general population, 513 were aware of UCB(408 educated, 105 uneducated) constituting 54%. Remaining 289(36%)(2 educated and 287 uneducated)

were unaware. Among 392 uneducated, 105 were totally aware of UCB procedure, applicability, limitations etc. (Table 1)

**Table 2: Cord blood storage longevity against populations awareness**

Longevity of cord blood storage ( years)	Population in number (n)	Aware Population(n)	Unaware population(n)	Population in %
5 -10	65	30	35	08
10 -15	80	45	35	10
15- 20	208	154	54	26
>20	449	284	165	56

Among 802 population, 284 out of 449 (56%) people had knowledge about the cord blood storage longevity, which was more than 20 years. The longevity of 15 to 20 years of cord blood storage was known by 154 aware people from 208 (26%) general population. The lowest 5 to 10 years longevity was aware by only 30 people out of 65(08%). Even if unaware people were less, most of them know about the longevity of more than 20 years. (Table 2)

cord blood units but evidentially it is only 15–18 years in *Indian J Med Research*,<sup>3</sup> 22.5 years in one study by Broxmeyer et al.,<sup>4</sup> and 25 years by Ballenet al.,<sup>5</sup> but which is > 20 years in accordance to majority of people in our study. In some studies, authors found, high efficient recovery of CB hematopoietic progenitor cells (HPCs) after 10 and 15 years,<sup>6</sup> and hematopoietic stem cells (HSCs) after 15 years<sup>7</sup> from human cryopreserved cord blood. According to sources more than 80 diseases have been diagnosed which could be cured with cord blood but only four diseases have been documented that are, Hodgkin lymphoma, Non Hodgkin lymphoma, and neuroblastoma. In our study population, uneducated people were almost same to educated and awareness was less about the longevity of cord blood storage, usefulness and cost as compared to educated aware people. The major drawback for its acceptability in the Indian society is its high investment.

## Discussion

A public or family bank is to process the cord blood to separate the blood component holding stem cells. The final product has a volume of 25 millilitres and includes a cryoprotectant which prevents the cells from bursting when frozen. Prior to freezing the cells, samples are taken for quality testing. Banks measure the number of cells that are positive for the CD34 marker, a protein that is used to estimate the number of blood-forming stem cells present. A portion of the sample is submitted to check that there is no bacterial or fungal contamination. Public banks will also check the ability of the sample to grow new cells by taking a culture called the Colony forming unit (CFU) assay. Total expense, approximately \$400 to \$450 per unit. When all the processing and testing is complete, the cord blood stem cells are frozen in cryogenic nitrogen freezers at -196° C until they are requested for patient therapy. Public banks are required to complete the entire laboratory processing and freeze the cord blood stem cells within 48 hours of collection. This is to insure the highest level of stem cell viability.<sup>2</sup>

Although the major cord blood banks have been assuring the long durability and efficacy of the stored

## Conclusion

In our present study, we knew that even uneducated, people more than 50% are aware about the cord blood storage either from health care provider or from blood bank but their knowledge about, how long to store and its cost is poor. So they are in a confused mind whether to store or not. Even if they want to store, whether can afford this cost or not till that period is a question for all.

## Recommendation

Local and central bodies related to health should give recommendation and guideline related to storage, usefulness to all people and health professional at grass root level. Storage should be free for all those

organisation and bodies willing to store and should be notified to public and health professional.

## References

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