

Awareness and practice regarding banking and collection of umbilical cord blood stem cells among nursing officers

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Abstract

Background: The umbilical cord blood collection and stem cells are still new ideas to many people; nurses are seen as the most reliable source to provide information regarding umbilical cord blood and stem cell collection. The research aimed to assess the awareness and training regarding umbilical cord blood stem cells (UCBSC) collection and understand the perceptions and behaviors of nursing officers.

Method: The current research was conducted by adopting a quantitative research approach and cross-sectional research designs. The sample size was 00 nursing officers working in the labor rooms. These samples were selected by using the convenience sampling technique. The investigators have used three tools to collect the necessary data, (i) a structured demographic questionnaire sheet, (ii) a Structured questionnaire on knowledge about umbilical cord stem collection and banking, (iii) the Attitude of nursing officers regarding umbilical cord (UC) stem cell banking. The tool's reliability was 0.89; it was found to be suitable to administer the tool on a large sample size.

Results: This investigation's findings revealed a statistically significant improvement in the total knowledge level regarding stem cells and UCB collection in nursing officers. The mean attitude score was 53.75 ± 8.26 , and the knowledge score was 16.84 ± 4.59 ; most nurses had a neutral attitude (78.6%) and excellent knowledge (42.86%). Even though none of the nurses received any in-service or pre-service instruction about umbilical cord blood banking or stem cells, 17 nurses experienced the collection of umbilical cord blood, and these nurses were all from the labor and delivery room. All the nurses were interested in learning more about stem cells and the UCB. Most nurses had heard about UCBB (62.5%) and cited other health care professionals as their source of information (74.28%). Nurses' attitudes and knowledge ratings were positively correlated ($p < 0.01$, $r = 0.532$).

Conclusion: Nurses require periodic training and education regarding umbilical cord blood collection. They must also know how many public umbilical cord blood banks are available.

Keywords: Blood collection; Stem cells; Transplantation; Umbilical cord.

Introduction

Today's most essential and contentious problems in science and technology are stem cell and umbilical cord blood collection. Since the year 2000, cord blood use has expanded significantly. As a result, the likelihood of any family member requiring stem cell transplantation is growing immensely [1]. Due to a lack of awareness about the advantages and collection of umbilical cord blood (UCB), it was formerly believed to be a medical trash item and discarded along with the placenta after delivery. However, due to advancements in knowledge, it is now regarded as a valuable item. Umbilical cord blood is a significant source of hematopoietic stem cells, which are lifesaving and are employed in hematopoietic transplantation [2].

These stem cells are identical to bone marrow stem cells. Furthermore, in the case of transplantation, the rejection rate of UCB stem cells is far lower than bone marrow stem cells. Additional advantages include simple availability and collection of cord blood stem cells and reduced disease transmission. As a result, cord blood may be utilized instead of bone marrow for transplantation [3, 4]. Furthermore, according to statistics from the CIBMTR ("Center for International Blood and Marrow Transplant Research"), the usage of bone marrow has decreased significantly. In contrast, the use of cord blood stem cells has increased [5]. UCB, embryonic, and adult stem cells are several kinds of stem cells. For more than two decades, cord blood has been effectively utilized in transplantation therapy to treat various life-threatening conditions, including genetic diseases, malignancies, metabolic disorders, blood problems, and immunological diseases.

Umbilical cord blood stem cells can transform and develop into several types of cells within the body. They aid in repairing tissues, organs, and blood vessels, as well as present clinicians with a treatment option for many disorders that need stem cell transplants [6]. It is possible to collect umbilical cord blood without harming the mother or the newborn donor. The umbilical cord blood is collected from the placenta 10 to 15 minutes after birth by puncturing the umbilical veins with a needle. The umbilical cord blood is organized into a sterile bag containing an anticoagulant to prevent clotting. Because stem cell treatment is a novel technique in medical research and the most sophisticated technology accessible internationally to heal the body's failing systems, most clients and their families are surprised to learn about it.

Furthermore, health care professionals, particularly staff nurses, lack sufficient expertise in umbilical cord blood stem cell treatment, a novel strategy. As a result, midwives, obstetricians, and nurses who have undergone training in this field are generally responsible for collecting umbilical cord blood [7]. Furthermore, since nurses are at the forefront of health-care delivery, they are actively engaged in all aspects of blood cord collection and stem cell collection, as well as delivering first-hand knowledge about UCB and stem cells to the people [8].

On allogeneic transplantation, these cells produce a lower donor-derived immune response than other stem cell sources. Therefore, graft-versus-host reactions are less common. (Peripheral cells or bone marrow). Unlike other sources, they may be transmitted even if there is no HLA match. The collecting method is simple and safe for the donor "mother or baby" [9].

Any pregnant woman can sign to donate the UCB at the time of childbirth, and anyone can use it free of cost at public blood banks. Private umbilical cord blood banking is only recommended in particular circumstances, such as when the infant's parents are known mutation carriers linked to blood, immunological, or metabolic illnesses. When there is an elderly relative who has any one of these illnesses gain benefit from umbilical cord blood stem cell transplantation, [10]

In 2005, Grossman et al. conducted a phone poll of African American women in the St. Louis region [11]; they discovered that enhancing knowledge regarding UCB donation and providing education about the importance and method of donation significantly increased donation rates. In 2003 study of pregnant women in Halifax, Fernandez et al. found that most women were interested in the information about UCB collection from a healthcare practitioner or a prenatal class and doctors in various clinics. Seventy percent of these respondents said they had little or no understanding of UCB banking [12].

Therefore, nurses must be well-versed in this area to provide parents with appropriate information and advice for pregnant women [8]. In addition, when the cord has been detached from the newborn and mother, nurses are responsible for collecting the umbilical cord blood. However, healthcare workers have various misunderstandings, misinformation, and insufficient awareness about umbilical cord blood and stem cells.

Methodology

A pilot study was conducted in selected hospitals from April 10 to May 15, 2021, using a structured questionnaire on awareness and practice regarding umbilical cord blood stem cell banking and collection among nursing officers working in the labor room, who were chosen based on the sampling criteria to test the feasibility of conducting study.

Sample size

The present study's sample comprised 100 male and female nursing officers. The samples are the nursing officers working in the labor rooms of selected hospitals. While determining the sample size, the investigators have considered the factors of sample availability, nature of the research, economy, time, and material.

Inclusion criteria

- Nurses working in the labor room.
- Nurses available during the period of data collection.

Variables

Independent variable

In this study, the independent variable was the awareness regarding umbilical cord stem cell banking and collection.

Dependent variable

The dependent variable was the practice, knowledge, and attitude of nursing officers working in the labor room regarding UCB stem cell collection and banking.

Methods

The researcher obtained formal approval from the institutional research committee (IRC) to conduct the study. Written permission was abstained from the hospital authority to conduct the study. After receiving the participants' written and oral consent, the structured questionnaire was administered by an interview technique. The questionnaire

consisted of three sections evaluating the nurses' knowledge, awareness, and practice about the collection and banking of UCB cells. Researchers have used descriptive and inferential statistics to analyze the data. Fisher's exact test was used to assess items linked to the association of knowledge and attitude among nursing officers.

Result

The purpose of this research was to evaluate and analyze data obtained from 100 nursing officers in labour room and to assess the awareness and practice of UCBS collection and banking. The information gathered for the research was organized and evaluated according to the stud's goals.

Table 1:Distribution of the samples based on their personal characteristics

n=100

Demographic variable	Frequency	%
Hospital Type		
Private	43	43%
Government	57	57%
Age		
21-25 years	14	14%
26-30 years	4	4%
31-35 years	8	8%
36-40 years	31	31%
41-45 years	41	41%
46-50 years	2	2%
Gender		
Male	40	40%
Female	60	60%
Marital status		
Married	72	72%
Unmarried	26	26%
Divorcee/ Separated	2	2%
Qualification		
Graduate in Nursing	63	63%
Postgraduate in Nursing	37	37%
Years of experience in labour room		
Less than 5 Year	37	37%
6-10 years	59	59%
Greater than 10 years	4	4%
Religion		
Hindu	61	61%
Christian	18	18%
Muslim	7	7%
Others	14	14%
Previous awareness		
Yes	60	60%
No	40	40%

Table 1 depicts that 43% of the nursing officers worked in private hospitals while 57% were from a government hospital. 41% were in the age group between 41-45 years, and 60% were females. 63% of them were nursing graduates, and 37% were postgraduates in nursing. 60% of them had attended online or physical training courses regarding UCBS collection and banking.

Table 2: The awareness of nursing officers regarding UCBCS banking and collection among nurses
 n=100

Knowledge	Score	Frequency	percentage
Poor	0-6	5	5%
Average	7-13	29	29%
Good	14-20	66	66%

Table 2 shows that the knowledge of nursing officers working in labour room is divided into the three levels. 5% of the nursing officers had a poor knowledge score of 0-6, 29% had average knowledge with a score of 7-13, and 66% had good knowledge and scores between 14 to 20.

Table 3: Attitude of nursing officers towards UCBCS collection and banking among nurses

Attitude	Freq	%
Negative (score <=30)	44	44%
Positive (score >30)	56	56%

As per table 3, we demonstrated that 44% of the nursing officers had a negative attitude (score <=30) while 56% of them had a positive attitude (score >30) towards UCBCS banking and collection.

Table 4: Fisher's exact test for association of knowledge among nursing officers working in labour room about banking and collection of UCBCS.

Demographic variable		Knowledge			p-value
		Average	Good	Poor	
Hospital Type	Private	12	29	2	1.000
	Government	17	37	3	
Age	21-25 years	11	2	1	0.004
	26-30 years	1	3	0	
	31-35 years	3	5	0	
	36-40 years	6	23	2	
	41-45 years	8	31	2	
Gender	Male	15	24	1	0.282
	Female	14	42	4	
Marital status	Married	11	58	3	0.000
	Unmarried	16	8	2	
	Divorcee/ Separated	2	0	0	
Qualification	Graduate in Nursing	20	39	4	0.553
	Postgraduate in Nursing	9	27	1	
experience Years in labour room	Less than 5 Year	16	20	1	0.065
	6-10 years	11	44	4	
	Greater than 10 years	2	2	0	
Religion	Hindu	19	41	1	0.170
	Christian	5	10	3	
	Muslim	2	4	1	
	Others	3	11	0	
Have you attended any Online or physical training	Yes	14	43	3	0.322

courses regarding umbilical cord blood stem cells collection and banking?	No	15	23	2	
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Table 5: Fisher's exact test for association of attitude among nursing officers working in labour room towardsUCB stem cells collection and banking.

Demographic variable		Attitude		p-value
		Negative	Positive	
Hospital Type	Private	25	18	0.016
	Government	19	38	
Age	21-25 years	7	7	0.024
	26-30 years	3	1	
	31-35 years	7	1	
	36-40 years	9	22	
	41-45 years	18	23	
	46-50 years	0	2	
Gender	Male	14	26	0.155
	Female	30	30	
Marital status	Married	27	45	0.042
	Unmarried	15	11	
	Divorcee/ Separated	2	0	
Qualification	Graduate in Nursing	23	40	0.062
	Postgraduate in Nursing	21	16	
Years of experience in labour room	Less than 5 Years	19	18	0.519
	6-10 years	23	36	
	Greater than 10 years	2	2	
Religion	Hindu	24	37	0.637
	Christian	10	8	
	Muslim	3	4	
	Others	7	7	
Have you attended any Online or physical training courses aboutcollection and banking of UCBS?	Yes	22	38	0.100
	No	22	18	

Discussion

Nurses and other healthcare workers are critical in educating the general population about different health conditions. Umbilical cord blood storage is a new therapy option for leukemia and Fanconi anemia disorders, and its function is being investigated in other conditions such as traumatic brain injuries and type 1 diabetes. Nurses must possess superior knowledge to educate the public about its application in the medical profession to treat different ailments.

The current research found a significant improvement in the total knowledge scores of nursing students in terms of their knowledge of UCBS collection during the study. On the other hand, El- Sayed et al., 2018 reported that after participating in an educational session, almost 75% of subjects acquired sufficient information, and there was a significant difference in knowledge levels before and after the educational program [13]. In addition, Mary, 2015 discovered that the nurses were unaware of the importance of placental stem cells. [14].

In the current research, nurses' awareness and opinions on stem cells and UCBB were inadequate. Most participants had average knowledge and a neutral attitude towards UCB banking and stem cells. Most nurses' may have average knowledge and neural attitude about stem cells and umbilical cord blood banking due to a lack of pre-service and

in-service education on the topics. Because none of the respondents received any pre-service or in-service instructions about stem cells or umbilical cord blood banking, all the subjects showed immense interest in learning more about stem cells and UCB. It is incredibly beneficial to equip nurses with UCBB-related knowledge and abilities. Similarly, they can inform their patients and the broader public about umbilical cord blood banking, including all the benefits, storage choices, and potential applications.

Health care experts have the most reliable information source considering stem cells and UCB banking. Most of the general population desired to obtain greater information about UCBB and stem cells from health care professionals, according to studies conducted by Rucinski et al. 2010; Dinç and Sahin, 2009; Perlow, 2006. Most of the nurses in the current research explained that if given the opportunity, they would want to become resource people to educate family, friends, and the broader public about public umbilical cord blood banking [15-17]. This conclusion is confirmed by research conducted by Herlihy and Delpapa, 2013. They found that obstetricians and other health care practitioners should play a key role in efforts to raise knowledge of umbilical cord blood banking [18].

In research on non-Hispanic blacks and Hispanics in Illinois, it was discovered that most women from these ethnic groups did not know about UCB donation or its function. There was also a lot of misunderstanding about public vs. private banking, the actual collecting mechanism, and the risk to themselves or their baby. On expectant mothers cited the length of the permission form as a hardship [19].

All prenatal mothers should have adequate knowledge regarding umbilical cord blood collection and storage facilities. Nurses trained in stem cells and UCBB are being used to provide counseling to pregnant mothers and the public in various hospital settings, including the labor room, ANC clinic, genetic clinic, pediatric OPD, and maternity ward. The research's shortcomings include less sample size and a single-center investigation, both limiting the results' generalizability. The enrolled nurses may articulate professionally accepted norms while concealing their true feelings. This research can be replicated with large sample size and in diverse situations. A qualitative approach to UCBB among nurses may aid in clarifying underlying difficulties.

Conclusion

Umbilical cord blood banking is a simple process that many parents and health professionals are unfamiliar with. By highlighting gaps, this work contributes to the corpus of knowledge in this area, emphasizing understanding and recommending further research, practice, and teaching in cord blood donation and banking, as well as cord blood usage. Based on the results of this research, it can be stated that nurses' understanding of cord blood collection methods and stem cells in the pre-educational program was weak and average, and they have a negative attitude. Furthermore, the research found that the training program can help improve nursing students' understanding and practices of blood cord collecting procedures and stem cells from pre-program to three months after graduation. The study's findings confirmed the necessity for nurses to access information about stem cells and UCB storage.

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