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EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING STEM CELLS AND CORD BLOOD BANKING AMONG ANTENATAL MOTHERS AT MOGAPPAIR, CHENNAI

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ABSTRACT

What could be more precious than gifting an unborn child to fight against various diseases for the rest of his/her life? Stem cells and cord blood banking is an emerging trend, where most part of this country is blind to. The main objective of this study was to assess the effectiveness of structured teaching programme on knowledge regarding stem cells and cord blood banking among antenatal mothers at Mogappair locality. Quantitative approach Quasi experimental one group pre-test and post-test design was adopted. A total of 50 samples were selected using simple random sampling technique. The tool used for the study 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. Section B comprises of structured questionnaire to assess the knowledge regarding stem cells and cord blood banking among antenatal mothers developed by the investigator which includes 18 questions. The data was collected and analysis was done using descriptive and inferential statistics. The results of the study revealed that there was a significant difference between pre-test and post-test knowledge on stem cell and cord blood banking among antenatal mothers at p=0.001 level.

KEY WORDS

Stem cells, cord blood banking, antenatal mothers, structured teaching programme

INTRODUCTION

The umbilical cord connects a baby in the womb to its mother. It runs from an opening in the baby's stomach to the placenta in the womb. The average cord is about 50cm (20 inches) long. The umbilical cord carries oxygen and nutrients from the placenta into your baby's blood stream.The umbilical cord is made up of One vein that carries blood rich in oxygen and nutrients from the mother to the baby two arteries that return deoxygenated blood and waste products, such as carbon dioxide, from the baby back to the placenta [1]

Stem cells have the remarkable potential to develop into many different cell types in the body during early life and growth. In addition, in many tissues they serve as a sort of internal repair system, dividing essentially without limit to replenish other cells as long as the person or animal is still alive. When a stem cell divides, each new cell has the potential either to remain a stem cell or become another type of cell with a more specialized function, such as a muscle cell, a red blood cell, or a brain cell. Stem cells are distinguished from other cell types by two important characteristics. First, they are unspecialized cells capable of renewing themselves through cell division, sometimes after long periods of inactivity. Second, under certain physiologic or experimental conditions, they can be induced to become tissue- or organ-specific cells with special functions. In some organs, such as the gut and bone marrow, stem cells regularly divide to repair and replace worn out or damaged tissues. In other organs, however, such as the pancreas and the heart, stem cells only divide under special conditions.[2]

After a baby is born and the umbilical cord is cut, some blood remains in the blood vessels of the placenta and the portion of the umbilical cord that remains attached to it. After birth, the baby no longer needs this extra blood. This blood is called placental blood or umbilical cord blood: "cord blood" for short.

Cord blood contains all the normal elements of blood - red blood cells, white blood cells, platelets and plasma. But it is also rich in hematopoietic (blood-forming) stem cells, similar to those found in bone marrow. This is why cord blood can be used for transplantation as an alternative to bone marrow.[3]

A cord blood bank is a facility which stores umbilical cord blood for future use. Both private and public cord blood banks have developed in response to the potential for cord blood in treating diseases of the blood and immune systems. [4]

Historically, umbilical cord blood was discarded with the placenta as medical waste. Over the past few decades, cord blood has been shown to contain stem cells and early precursor cells that can be used for life-saving stem cell transplantation for children and adults in need of a stem cell transplant. Cord blood is more tolerant of a new host and can be used without full matching, providing increased access to transplantation for patients who cannot find a matched donor. [5]

Umbilical cord blood can be collected without risk to the mother or infant donor. Cord blood can be collected from the placenta, either during the third stage of labour or within 10 to 15 minutes after delivery of the placenta, by sterilely puncturing one of the umbilical veins with a needle and allowing the cord blood to drain into a sterile bag containing an anticoagulant to prevent clotting.[5]

Despite growing evidence of the therapeutic benefits of umbilical cord derived stem cells and promotion of umbilical cord blood collection for allogeneic, family directed, or autologous use in the media, surveys reveal that the majority of pregnant women (70 to 80%) lack knowledge about stem cells and cord blood banking and want more information. While most women (80% to 90%) would prefer to receive information about cord blood banking from their health care professionals, prenatal education and counselling is only provided to a minority (15 to 30%).Consequently, many pregnant women receive information through printed material, the internet, or the media.[6][7][8][9][10][11]

Because newborn infants are unable to consent to the collection, testing, donation, and storage of their cord blood, informed consent must be obtained and documented from the mother or father. Cord blood collected for therapeutic use or research is not considered waste material and it is generally agreed that informed consent for collection is required.[12] Prenatal, pre-labour, and post-collection consent policies have been developed by cord blood banks and professional organizations to address the procedural and financial priorities of public and private blood banks,[13][14]. and so could be obtained at presentation in early labour. It is generally agreed that consent should be obtained prior to the onset of active labour and ideally during the third trimester of the prenatal period.[15]

MATERIALS AND METHODS

Quantitative approach and quasi experimental one group pre-test and post-test design was adopted for the study. The study was conducted in an urban area at Mogappair, Chennai Tamil Nadu after obtaining permission from the area Councillor. The independent variable includes structured teaching programme, the dependent variable includes on knowledge regarding stem cells and cord blood banking. Simple random sampling was adopted. The ward area councillor granted permission to conduct the study at Mogappair locality among antenatal mothers. With the brief introduction of the study, informed consent was obtained from all the study participants.

INSTRUMENTS

Tool (a) Demographic data: This was developed to obtain information on personal and family details. Tool (b) Structured Questionnaire: This tool was developed by the investigators modified to suit for the Indian antenatal population. This tool was formulated based on the structured teaching programme given to the Antenatal mothers. It consists of 18 questions. Each correct answer was awarded as score “1” and wrong answer was awarded as score “0”. Higher score indicates good knowledge. Content validity of the tool was obtained from various nursing experts. The reliability of the tool was established by test retest method and the r –value obtained was 0.8 which indicates positive correlation.

INTERVENTION

The study participants were given a short introduction regarding the study and it’s purpose and informed consent was obtained from the participants. Pre test and post test method was adopted. Pre test was done by giving questionnaires to the participants and structured teaching programme on stem cells and cord blood banking using Flash cards was given after the pre test for the duration of 30 mts in their local language. Post test was conducted 7 days after pre test.

DATA ANALYSIS

Data was analyzed using SPSS; Version 16.0 (IBM, Chicago, USA) was used to obtain the p value. P

values (=0.001) were considered to indicate significant statistical difference. (**Sharma S 2011**)[11]

RESULTS

Table1:Distribution of demographic variables related to the effectiveness of structured teaching programme on knowledge regarding stem cells and cord blood banking among antenatal mothers at mogappair, Chennai N=50

Demographic variables		Antenatal mothers	%
Age	18 - 22 years	14	28.0%
		22	44.0%
	23 - 27 years		
		12	24.0%
	28 - 32 years		
		2	4.0%
	33 - 37 years		
Gravida	Primi	28	56.0%
		22	44.0%
	Multi		
Education	Primary	2	4.0%
		13	26.0%
	Secondary		
		18	36.0%
	Higher secondary		
		17	34.0%
	Degree and above		
Availability of mass media	Television	36	72.0%
		5	10.0%
	Newspaper		
		9	18.0%
	Internet		
Occupation of the head of the family	Public sector employee	8	16.0%
		37	74.0%
	Private sector employee		
		5	10.0%
	Self employed		
Occupation of self	Public sector employee	2	4.0%
		11	22.0%
	Private sector employee		
		37	74.0%
	Unemployed		
Family size	Two	17	34.0%
		18	36.0%
	Three		
		3	6.0%
	Four		
	>Four	12	24.0%
Type of family	Nuclear family	35	70.0%
	Joint family	15	30.0%

Table 2: Pre-test level of knowledge on Stem cells and cord blood banking among antenatal mother N:50

Level of knowledge	No. of mothers	%
Inadequate	28	56.0%
Moderate	22	44.0%
Adequate	0	0.0%
Total	50	100%

Table 2 shows pre test level of knowledge on stem cells and cord blood banking among antenatal mothers at Mogappair In general 56.0% of the mothers are having inadequate knowledge score, 44.0% of them are having moderate knowledge score and none of them are having adequate score.

Table 3: Post-test level of knowledge on Stem cells and cord blood banking among antenatal mother; N: 50

Level of knowledge	No. of mothers	%
Inadequate	0	0.0%
Moderate	14	28.0%
Adequate	36	72.0%
Total	50	100%

Table 3 shows post test level of knowledge on stem cells and cord blood banking among antenatal mothers at Mogappair. In general 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.

Table 4: Comparison between pre-test and post-test knowledge on Stem cell and cord blood banking among antenatal mother; N:50

Test	No.of Mothers	Mean ± SD	Difference	Student's paired t-test
Pre-test	50	5.60±2.62	8.84	t=19.51 P=0.001***
Post-test	50	14.44±2.29		significant

*** significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001**

Table no 4 shows the comparison of overall knowledge score between pretest and posttest. In pretest , mothers are having 5.60 score where as in posttest they are having 14.44 score , so the difference is 8.84 score.

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.

Table 5: Effectiveness of STP on Stem cell and cord blood banking among antenatal mothers; N: 50

Test	Max score	Mean knowledge score	Mean Difference in knowledge score with 95% Confidence interval	Percentage of knowledge gain score with 95% Confidence interval
Pretest	18	5.60	8.84(7.93 – 9.75)	49.1 %(44.1% –54.1%)
Posttest	18	14.44		

Table no 5 shows the comparison of overall knowledge score between pretest and posttest. On an average, in post-test, mothers are **gained** 49.1% of knowledge score after demonstration of STP. Differences between pretest and posttest score was analysed using percentage with 95% CI and mean difference with 95% CI.

Table 6: Association between knowledge gain score on Stem cells and cord blood banking among antenatal mothers and their demographic variable; N=50

Demographic Variables		n	posttest		pretest		Dif		Oneway ANOVA F-test/t-test
			Mean	SD	Mean	SD	Mean	SD	
Age	18 - 22 years	14	12.64	1.34	4.93	1.54	7.71	2.23	**F=3.84 P=0.02***
	23 - 27 years	22	15.59	2.15	7.05	2.21	8.55	2.79	
	28 - 32 years	12	14.92	1.93	3.75	3.11	11.17	3.95	
	33 - 37 years	2	11.50	.71	5.50	2.12	6.00	1.41	
Gravida	Primi	28	14.25	2.59	6.36	2.13	7.89	2.53	**t=2.48 P=0.02***
	Multi	22	14.68	1.86	4.64	2.92	10.05	3.61	
Education	Primary	2	13.72	1.90	5.61	2.33	8.11	2.52	**F=2.82 P=0.05***
	Secondary	13	15.76	2.61	6.88	2.29	8.88	3.26	
	Higher secondary	18	13.69	1.80	4.23	2.83	9.46	4.01	
	Degree and above	17	14.50	.71	3.50	2.12	11.00	2.83	
Availability of mass media	Television	36	13.97	1.95	4.86	2.45	9.11	3.20	F=0.52 P=0.59
	Newspaper	5	15.40	2.61	6.80	2.28	8.60	3.78	
	Internet	9	15.78	2.91	7.89	2.03	7.89	3.10	
Occupation of the head of the family	Public sector employee	8	14.63	1.92	6.50	2.14	8.13	2.64	F=1.58 P=0.21
	Private sector employee	37	14.59	2.42	5.32	2.76	9.27	3.37	
	Self employed	5	13.00	1.41	6.20	2.28	6.80	1.79	
Occupation of self	Public sector employee	2	12.50	.71	7.50	.71	5.00	1.41	F=1.63 P=0.21
	Private sector employee	11	16.18	2.75	7.55	1.69	8.64	2.66	
	Unemployed	37	14.03	1.92	4.92	2.60	9.11	3.32	
Family size	Two	17	14.88	2.93	6.41	2.48	8.47	2.67	F=0.36 P=0.78
	Three	18	14.33	2.11	5.72	2.54	8.61	3.38	
	Four	3	14.67	1.15	5.67	2.08	9.00	1.00	
	>Four	12	13.92	1.73	4.25	2.83	9.67	4.05	
Type of family	Nuclear family	35	14.66	2.46	6.11	2.49	8.54	3.01	t=1.01 P=0.32
	Joint family	15	13.93	1.79	4.40	2.61	9.53	3.62	

Table 6 shows the association between knowledge gain score on stem cells and cord blood banking among antenatal mothers and their demographic variable. Elders, multi para and more educated are gained more knowledge than others. It was confirmed using One-way ANOVA F-test and student independent t-test.

DISCUSSION

Umbilical cord blood is used as a source of hematopoietic stem cells for bone marrow transplantation in the treatment of malignant and non malignant disease. The studies sought to examine pregnant women's knowledge and attitudes regarding cord blood banking, as their support is crucial to the success of cord blood transplant programs.[16]

The present study was conducted to assess the knowledge regarding stem cells and cord blood banking among antenatal mothers' .The results 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.

Similar study was conducted by Conrad V.Fernandez, et.al in 2003 on knowledge and attitudes of pregnant women with regard to collection, testing and banking of cord blood stem cells..A total of 443 women (68%) responded. More than half of the women (307/438 or

70% [95% confidence interval, CI, 66% to 74%]) reported poor or very poor knowledge about cord blood banking. Many of the respondents (299/441 or 68% [95% CI 63% to 72%]) thought that physicians should talk to pregnant women about the collection of cord blood, and they wanted to receive information about this topic from health care professionals (290/441 or 66% [95% CI 61% to 70%]) or prenatal classes (308/441 or 70% [95% CI 65% to 74%]). Most of the women (379/442 or 86% [95% CI 82% to 89%]) would elect to store cord blood in a public bank, many citing altruism as the reason for this choice. Most of the women in this study supported the donation of cord blood to public cord blood banks for potential transplantation and research. [16]

Mayan Kumar Saran et.al, in (2015) conducted a similar cross-sectional survey on Knowledge and awareness of stem cells among expectant mothers and parents of elementary school children in which a close-ended questionnaire proforma was given to a sample of 1009 subjects who are parents of elementary school children and expectant mothers from Bareilly and Delhi cities. After 1-week, the filled questionnaire proforma was collected back from the school children and expectant mothers. The results were analyzed using Chi-square test. Out of a sample of 1009 subjects, 809 were from Bareilly (401 expectant mothers and 408 parents of elementary school children) and remaining 200 from Delhi (104 were expectant mothers and 96 parents of elementary school children). The awareness about stem cells was 25% from Delhi and 18% from Bareilly and this difference was statistically significant.[17]

SUMMARY AND CONCLUSION

This study was conducted to assess the knowledge regarding stem cells and cord blood banking before and after the structured teaching programme. As per the results, 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 which reflects that nurses should play a vital role in educating them about stem cell and cord blood banking when they attend antenatal check up in various health care settings.

RECOMMENDATIONS

The following recommendations have been made for further study.

- A similar study can be done on a large sample for generalization
- Comparative study can be done in an urban and rural mothers regarding knowledge of stem cells and cord blood banking
- Counselling can be done and it can be continued as a part of education on stem cells and cord blood banking
- CD and Cassettes regarding contraceptive methods can be played in the antenatal OPD in the OP timings for the patients and attenders.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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