

## Effectiveness of Information, Education, Communication Package on Knowledge Regarding Stem Cells among Antenatal Mothers at Chrompet General Hospital, Kancheepuram District

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### Abstract

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. The main objective of this study was to assess the effectiveness of IEC Package on knowledge regarding stem cells among antenatal mothers at Chrompet General Hospital. 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 among antenatal mothers developed by the investigator which includes 18 questions. The data was collected and analysed by 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 among antenatal mothers at  $p=0.001$  level.

**Keywords:** Stem Cells; Antenatal Mothers; Information; Education; Communication Package.

### Introduction

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 [1].

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].

Until recently, scientists primarily worked with

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two kinds of stem cells from animals and humans: embryonic stem cells and non-embryonic "somatic" or "adult" stem cells. The functions and characteristics of these cells will be explained in this document. Scientists discovered ways to derive embryonic stem cells from early mouse embryos more than 30 years ago, in 1981. The detailed study of the biology of mouse stem cells led to the discovery, in 1998, of a method to derive stem cells from human embryos and grow the cells in the laboratory. These cells are called human embryonic stem cells. The embryos used in these studies were created for reproductive purposes through *in vitro* fertilization procedures. When they were no longer needed for that purpose, they were donated for research with the informed consent of the donor. In 2006, researchers made another breakthrough by identifying conditions that would allow some specialized adult cells to be "reprogrammed" genetically to assume a stem cell-like state. This new type of stem cell, called induced pluripotent stem cells (iPSCs), will be discussed in a later section of this document [3].

Stem cells are important for living organisms for many reasons. In the 3- to 5-day-old embryo, called a blastocyst, the inner cells give rise to the entire body of the organism, including all of the many specialized cell types and organs such as the heart, lungs, skin, sperm, eggs and other tissues. In some adult tissues, such as bone marrow, muscle, and brain, discrete populations of adult stem cells generate replacements for cells that are lost through normal wear and tear, injury, or disease [4,5].

Given their unique regenerative abilities, stem cells offer new potentials for treating diseases such as diabetes, and heart disease. However, much work remains to be done in the laboratory and the clinic to understand how to use these cells for cell-based therapies to treat disease, which is also referred to as regenerative or reparative medicine [6,7].

Laboratory studies of stem cells enable scientists to learn about the cells' essential properties and what makes them different from specialized cell types. Scientists are already using stem cells in the laboratory to screen new drugs and to develop model systems to study normal growth and identify the causes of birth defects.

Research on stem cells continues to advance knowledge about how an organism develops from a single cell and how healthy cells replace damaged cells in adult organisms. Stem cell research is one of the most fascinating areas of contemporary biology, but, as with many expanding fields of scientific inquiry, research on stem cells raises scientific

questions as rapidly as it generates new discoveries [8,9,10].

### *Objectives*

1. To determine the effectiveness of IEC Package on Stem Cells among Antenatal Mothers.
2. To associate the post test level of Knowledge on stem cells among Antenatal Mothers with their demographic variables.

### **Materials and Methods**

#### *Participants and Methods*

In our study, quantitative approach and Quasi experimental one group pre and posttest research design were adopted. Sample size was 50 Antenatal mothers. Based on the Random sampling technique, inclusion and exclusion criteria samples were selected. The independent variable includes IEC Package on Stem Cells, the dependent variable includes onknowledge regarding stem cells .

#### *Ethical Consideration*

Formal approval was obtained from the Institutional review board and Institutional ethical committee of SRM University, Kattankulathur, Chennai, Tamilnadu, India. In addition, the participants were informed of their right to withdraw anytime during the course of the study.

#### *Instruments*

Questionnaires comprises two sections. Section I includes demographic data, Section II comprises on Structured Questionnaire. 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 0.7 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. Pretest and posttest method was adopted. Pretest was done by giving questionnaires to the participants and structured teaching

programme on stem cells using Flash cards was given after the pretest for the duration of 30 mts in their local language. Posttest was conducted 7 days after pretest.

*Statistical Analysis*

The information collected from the study participants was scored and tabulated. The data was entered into the master coding sheet and saved in EXCEL. Statistical analysis was conducted with the help of the Statistical Package for Social Sciences (SPSS)-16.

**Results**

Table 2 shows pre test level of knowledge on stem cells among antenatal mothers. 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 shows post test level of knowledge on stem cells among antenatal mothers. 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 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 IEC, 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 shows the comparison of overall knowledge score between pretest and posttest. On an average, in post-test, mothers regained 49.1% of knowledge score after IEC. Differences between pretest and posttest score was analysed using percentage with 95% CI and mean difference with 95% CI.

**Table 1:** Frequency and percentage distribution of demographic variables of Antenatal Mothers N=50

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

**Table 2:** Frequency and Percentage distribution of Pre-test level of knowledge on Stem cells 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 3:** Frequency and Percentage distribution of Post-test level of knowledge on Stem cells among antenatal mother

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

**Table 4:** Comparison between pre-test and post-test knowledge on Stem cells among antenatal mother N:50

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

\*significant at Pd"0.05 \*\*highly significant at Pd"0.01 \*\*\*very high significant at Pd"0.001

**Table 5:** Effectiveness of STP on Stem cell 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 6:** Association on Post test level of knowledge gain score on Stem cells 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	<b>F=3.84 P=0.02*</b>
	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	<b>t=2.48 P=0.02*</b>
	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	<b>F=2.82 P=0.05*</b>
	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	
Occupation of the head of the family	Internet	9	15.78	2.91	7.89	2.03	7.89	3.10	F=1.58 P=0.21
	Public sector employee	8	14.63	1.92	6.50	2.14	8.13	2.64	
Occupation of self	Private sector employee	37	14.59	2.42	5.32	2.76	9.27	3.37	F=1.63 P=0.21
	Self employed	5	13.00	1.41	6.20	2.28	6.80	1.79	
	Public sector employee	2	12.50	.71	7.50	.71	5.00	1.41	
Family size	Private sector employee	11	16.18	2.75	7.55	1.69	8.64	2.66	F=0.36 P=0.78
	Unemployed	37	14.03	1.92	4.92	2.60	9.11	3.32	
	Two	17	14.88	2.93	6.41	2.48	8.47	2.67	
	Three	18	14.33	2.11	5.72	2.54	8.61	3.38	
Type of family	Four	3	14.67	1.15	5.67	2.08	9.00	1.00	t=1.01 P=0.32
	>Four	12	13.92	1.73	4.25	2.83	9.67	4.05	
	Nuclear family	35	14.66	2.46	6.11	2.49	8.54	3.01	
	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 among antenatal mothers and their demographic variable. Elderly primi, multi para and more educated are gained more knowledge than others. It was confirmed using Oneway 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

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 [11].

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 [12].

### Acknowledgement

The author acknowledges Dr. Jaya Mohan Raj, Former Dean, SRM College of Nursing for constant

guidance, Dr. Venkatesan, Bio-Statistician, for his guidance and constant support in statistical analysis. We would like to thank study participants. The author would also like to thank Mr. Karnamurthy P and friends for their constant support.

### Conflict of Interest

The author declares no conflict of interest. In addition, this study was not funded.

### Summary and Conclusion

This study was conducted to assess the effectiveness of IEC Package on knowledge regarding stem cells. As per the results, after the IEC, none of the mothers are having inadequate knowledge, 28.0% of them are having moderate knowledge and 72% of them are having adequate which reflects that nurses should play a vital role in educating them about stem cells when they attend antenatal check up in various health care settings.

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