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An experimental study to assess the effectiveness of self-instructional module (Sim) on knowledge regarding cord blood banking & stem cell therapy among antenatal women in selected health care institutions of Pune City

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Abstract
Introduction: Stem cells are a primitive cell type found in all animals and are capable of both self-renewal and differentiation. It is this capacity for self-renewal and for differentiation into repair cells that offers great potential for regenerative medicine.
Purpose of the study was to assess the effectiveness of Self Instructional Module (SIM) on knowledge regarding cord blood banking & stem cell therapy among antenatal women in selected health care institutions of Pune city
Material and method: A Quasi-experimental Pre test – post test control group design with Non probability Purposive Sampling method. The tool consisted of section I (demographic data), and section II (structured knowledge questionnaire) to assess the knowledge on cord blood banking & stem cell therapy.
Result: Majority 44% of the control group and 62% of the experimental group participants are in the age group of 21 to 25 years. 32% of participants of control group are educated up to primary level. While in the experimental group most of the participants i.e. 38% have secondary level of education. Most of the participants are housewives / homemakers i.e. 80% participants from control group and 88% participants from experimental group. 44% of the participants from both the groups had no children.58% participants from control group and 68% from experimental group are Hindus. The mean score of experimental group is less i.e. 1.20 in pretest which has increased to 2.54; this increase is found significant which has determined the effectiveness of Self Instructional Module (SIM). Pre-interventional finding are only associated with the level of education of the participants.
Conclusion: The analysis reveals that Self Instructional Module was helpful to improve the knowledge regarding cord blood banking & stem cell therapy among antenatal women.

Keywords: Cord Blood Banking, Stem Cell Therapy, Antenatal Women, Self Instruction Module, Knowledge, Questionnaire

Introduction
Stem cells are primordial type of cells which is found in every kind of animals. They are able of self replication & diversification. The ability for self replication & diversification into other cells offers huge potential for regenerative medicine [1].
Researches in cord blood transplant were on the basis of theory that the cells of immune system present in the cord blood maybe immature compared to cells found in adult bone marrow. Advantages of cord blood over bone-marrow are its readily available, its lesser possibility for transmission of infectious diseases, and the negligible risk at the time of collection [2].

Need of the study
The use of cord blood transplant has shown a drastic increase in countries like United States, Europe, & Japan. Researches show favorable results in a different settings, even though use & success is restricted by many difficulties, including the need for a HLA match [6].
Umbilical cord blood was once a waste product. Childbirth educators are one of the major sources through which the expecting family gains more knowledge about Cord Blood Banking. The educator is expected to be knowledgeable regarding Cord Blood Banking [7].
As the researcher felt there is lack of knowledge and awareness among people regarding Cord

Blood Banking and Stem Cell Therapy, it was important to educate the public about the potential uses and advantages.

Statement of problem

"An experimental study to assess the effectiveness of Self Instructional Module (SIM) on knowledge regarding Cord Blood Banking and Stem Cell Therapy among antenatal women in selected health care institutions of Pune city."

Purpose

To assess the effectiveness of Self Instructional Module (SIM) on knowledge regarding cord blood banking and stem cell therapy among antenatal women in selected health care institutions of Pune city.

Objectives

1. To assess the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy before the Self Instructional Module (SIM) in both the groups.
2. To assess the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy after the Self Instructional Module (SIM) in the Group B (experimental group) and Group A (control group).
3. To compare the pre and post evaluation of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy.
4. To determine the effectiveness of Self Instructional Module (SIM) on knowledge regarding Cord Blood Banking and Stem Cell Therapy among antenatal women.
5. To associate the pre interventional findings with selected demographic variables.

Assumptions

The study assumed that

- Women may have poor knowledge on Cord Blood Banking & Stem Cell Therapy
- Knowledge on Cord Blood Banking & Stem Cell Therapy is measurable
- Self Instructional Module (SIM) may be effective in increasing the knowledge regarding Cord Blood Banking & Stem Cell Therapy

Hypothesis

Hypothesis for Effectiveness

There is no considerable change in the pre test and post test scores of knowledge among antenatal women regarding Cord Blood Banking & Stem Cell Therapy at 0.05 level of significance.

Hypothesis for Association

There is no considerable association between the knowledge and demographic variables at 0.05 level of significance.

Research Approach - Quantitative approach.

Research Design - Quasi experimental - Pre test - post test control group design.

Variables of the study

- **Dependent Variable: -** the level of knowledge of antenatal women.
- **Independent Variable: -** the Self Instructional Module (SIM) on Stem Cell Therapy and Cord Blood Banking

Settings

- Kamala Nehru Hospital, Pune
- Shrimati. Kashibai Nawale Medical College & General Hospital, Pune

Population

Target: - Antenatal women who are attending ANC clinic.

Accessible: - Antenatal women who are attending ANC clinic at selected health care institutions of Pune city.

Sample

Antenatal women attending ANC clinic at selected health care institutions of Pune city.

Sample size

The sample size is 100. i.e. 50 women in Group A (control group) and 50 women in the Group B (experimental group).

Sampling techniques - Non probability Purposive Sampling

Data collection

Table 1: Tools and techniques

Tool no	Tools	Variables to be measured	Number of questions	Technique / method
Section I	Structured questionnaire	Demographic variable	5	Pen and paper
Section II	Structured Questionnaire	Knowledge Level	15	Pen and paper

Based on the objectives of the study, analysis & interpretation of data were done by using descriptive & inferential statistics.

Organization & presentation of data

Data had been organized and represented under the following heading

- **Section 1:** Findings related to demographic characteristics of the samples.
- **Section 2:** Findings related to evaluation of the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy before the Self Instructional Module (SIM) in both the groups.
- **Section 3:** Findings related to the evaluation the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy after the Self Instructional Module (SIM) in the Group B (experimental group) and Group A (control group).
- **Section 4:** Findings related to the comparison of the pre and post evaluation of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy.
- **Section 5:** Findings related to the effectiveness of Self-Instructional Module (SIM) on knowledge regarding Cord Blood Banking and Stem Cell Therapy among antenatal women.
- **Section 6:** Findings related to the association between pre interventional knowledge and selected demographic variables.

Section 1: To describe the demographic variables of the sample.

A] Age distribution of the participants in the Group A (control group) and Group B (experimental group).

N = 100; $n_1 = 50$, $n_2 = 50$

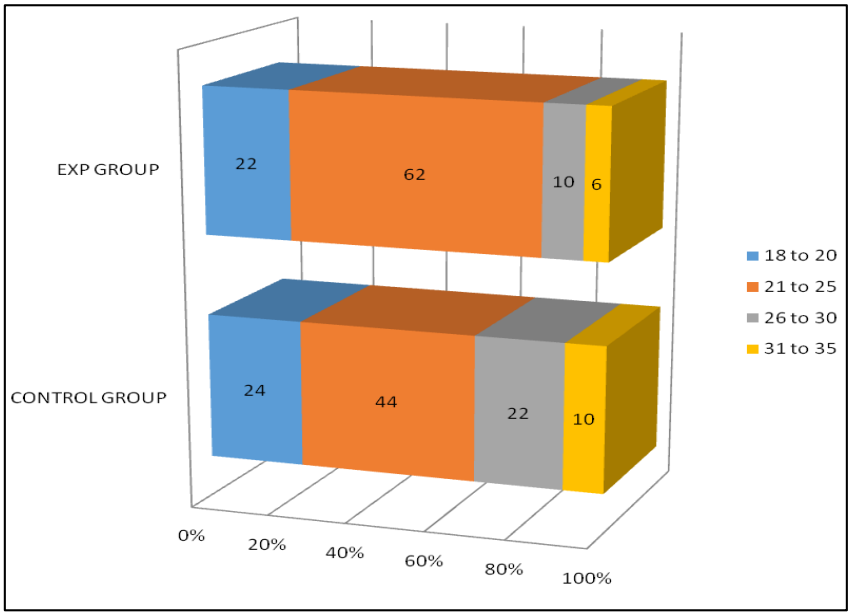
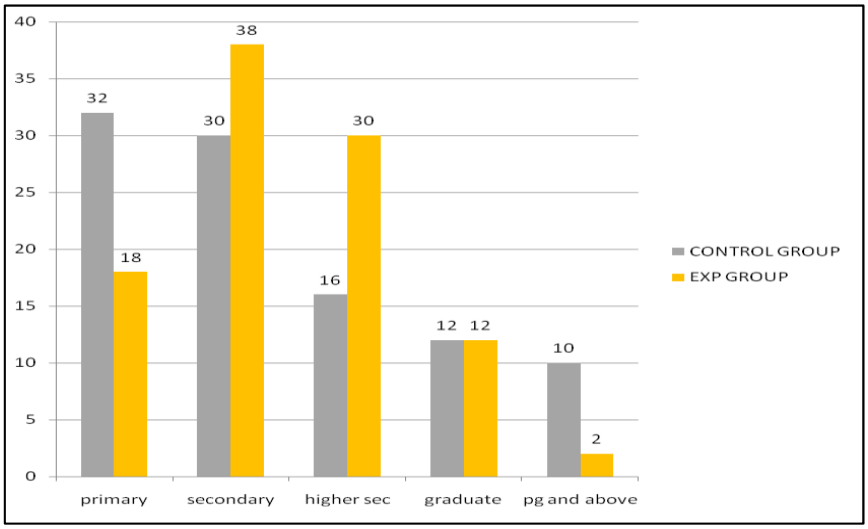


Fig 1: Distribution of Group A (control group) and Group B (experimental group) participants' according age (in percentage).

Figure 1 shows that almost 44% of the participants in the Group A (control group) and 62% of the participants of the Group B (experimental group) are in the age group of 21 to 25 years. Only 10% of participants from Group A (control group) and 6% of participants from Group B (experimental group) are in the age group of 31 to 35 years. 24% from Group A (control group) & 22% participants from Group B (experimental group) are in the age group of 18 to 20 yrs. Remaining 10% from Group B (experimental group) & 22% from Group A (control group) are from the age group of 26 to 30 yrs.

B] Education distribution of the participants in the Group A (control group) and Group B (experimental group).



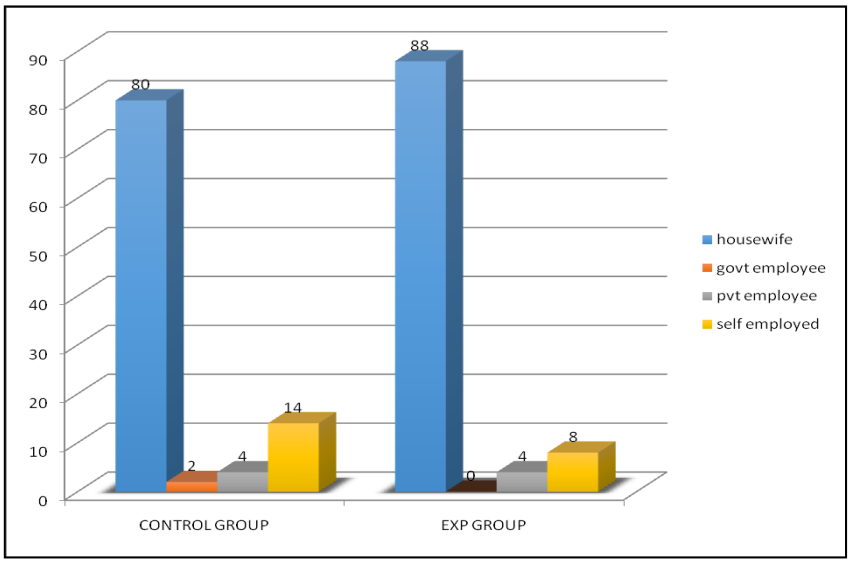
N = 100; $n_1 = 50$, $n_2 = 50$

Fig 2: Distribution of Group A (control group) and Group B (experimental group) participants according education (in percentage).

Fig 2 shows that all the participants had received at least primary education. 32%of participants of Group A (control group) are educated up to primary level while 18% of participants from Group B (experimental group) have primary education. In the Group B (experimental group) most of the participants i.e. 38% have secondary level of education while 30% participants from Group A (control group) have secondary education.

16% of participants of Group A (control group) and 30% of participants of Group B (experimental group) are having education up to higher secondary level. 12% of participants of both the groups have education up to graduate level. Only 10% participants from Group A (control group) and 2% participants from Group B (experimental group) have education up to post graduate level or above.

C] Occupation distribution of the participants in the Group A (control group) and Group B (experimental group).

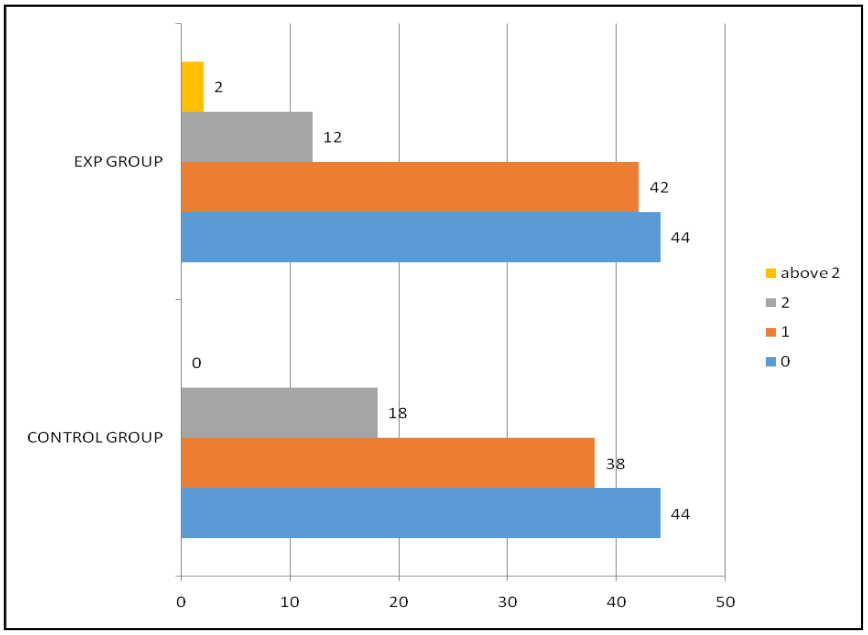


N = 100; n_1 = 50, n_2 = 50

Fig 3: Distribution of Group A (control group) and Group B (experimental group) participants according occupation (in percentage)

According to Fig 3 most of the participants are housewives / homemakers. i.e. 80% participants from Group A (control group) and 88% participants from Group B (experimental group). Only 2% of participants from Group A (control group) are govt. employees. 4% participants from both the groups are private sector employees. 14% participants from Group A (control group) and 8% participants from Group B (experimental group) are self employed.

D] Distribution of the participants according to the number of children in the Group A (control Group) and Group B (experimental group).

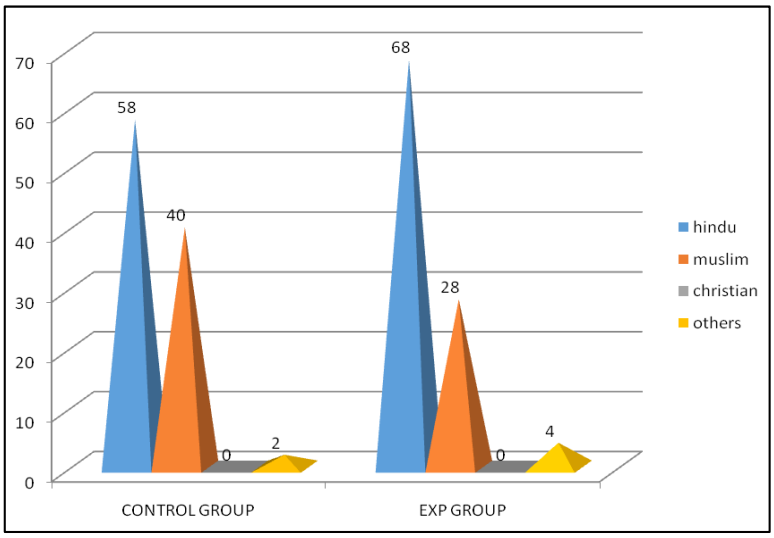


N = 100; n_1 = 50, n_2 = 50

Fig 4: Distribution of Group A (control group) and Group B (experimental group) participants according the number of children (in percentage)

Fig 4 shows that 44% of the participants from both the groups were primi mothers. i.e. had no children. Where as only 2% of the participants from the Group B (experimental group) had more than 2 children. 38% of the participants from the Group A (control group) & 42% participants from the Group B (experimental group) had only one child.

E) Distribution of the participants according to the religion in Group A (control group) as well as Group B (experimental group).



N = 100; n1 = 50, n2 = 50

Fig 5: Distribution of Group A (control group) and Group B (experimental group) participants according to religion (in percentage)

Fig 5 shows that 58% participants from Group A (control group) and 68% from Group B (experimental group) are Hindus. Muslims are 40% in Group A (control group) & 28% in Group B (experimental group). Only 2% from Group A (control group) & 4% from Group B (experimental group) were from other religions. There are no Christians in both the groups.

Section 2: To assess the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy before the Self Instructional Module (SIM) in both the groups.

Table 2: Pretest knowledge scores of Group A (control group) and Group B (experimental group) antenatal women regarding Cord Blood Banking and Stem Cell Therapy. N = 100; n_1 = 50, n_2 = 50

Knowledge Score	Group A (control group) (n_1=50)		Group B (experimental group) (n_2=50)	
	F	**%**	***F***	**%**
Poor (0 -3)	37	74	43	86
Average (4-7)	11	22	7	14
Good (8-11)	2	4	0	0
Excellent (12-15)	0	0	0	0

Table 2 revealed that Group B (experimental group) participants 43(86%) had poor knowledge whereas in Group A (control group) participants 37(74%) had poor knowledge. None of the participants from Group A (control group) had excellent knowledge and in an experimental not single participant had good knowledge. These arithmetic calculations were tested for central tendency mean, median and standard deviation to find out the distribution of sample. The table below depicts the measures of central tendency.

Table 3: Distribution of Group A (control group) and Group B (experimental group) sample in pretest knowledge score, N = 100; n_1 = 50, n_2 = 50

Statistics	Group A (control group) (n_1=50)	Group B (experimental group) (n_2=50)
Mean	2.1800	1.2000
Median	1.0000	.0000
Std. Deviation	2.37065	1.85164
Variance	5.620	3.429

Table 3 depicts that in Group A (control group) Mean (μ) =2.1800 where as Group B (experimental group) Mean (μ) =1.2000. The difference between two μ is -0.98. The calculated p = (.023) < .05 this revels that two group μ is considerably different in terms of pre test knowledge. Hence we reject null hypothesis that there is no considerable change in the pre test scores of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy at 0.05 level of significance. This result can be interpreted that participants from Group A (control group) and Group B (experimental group) do not follow the normal distribution. Hence the researcher of this study has decided to use non parametric statistical test to assess the effectiveness of intervention on knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy.

Section 3: To assess the knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy after the Self Instructional Module (SIM) in the Group B (experimental group) and Group A (control group).

Table 4: Post-test knowledge scores of Group A (control group) and Group B (experimental group) antenatal women regarding Cord Blood Banking and Stem Cell Therapy, **N =** 100; $n_1 = 50$, $n_2 = 50$

Scores	Group A (control group) (n_1=50)		Group B (experimental group) (n_2=50)	
Marks	***F***	**%**	***F***	**%**
Poor (0 -3)	46	92	31	62
Average (4-7)	4	8	19	38
Good (8-11)	0	0	0	0
Excellent(12-15)	0	0	0	0

Table no 4 shows that Group B (experimental group) participants 31(62%) scored in the range between 0-3 marks out of 15marks; whereas Group A (control group) participants were 46(92%). From Group A (control group) and an Group B (experimental group) not single participant scored 8 marks and above. These arithmetic calculations were tested for central tendency of post experimental scores i.e mean, median and standard deviation. The table below depicts the measures of central tendency.

Table 5: Distribution of Group A (control group) and Group B (experimental group) sample in post-test knowledge score, N = 100; $n_1 = 50$, $n_2 = 50$

Statistics	Group A (control group) (n_1=50)	Group B (experimental group) (n_2=50)
Mean	2.0600	2.5400
Median	0.0000	3.0000
Std. Deviation	1.462	2.233
Variance	2.139	4.98

Table no 5 shows that the Group A (control group) Mean (μ) =2.06 where as Group B (experimental group) Mean (μ) =2.54. Median for Group A (control group) was 0.0000 and for Group B (experimental group) were 3.0000. Standard deviation for the Group A (control group) was 1.462 & for the Group B (experimental group) it was 2.233. Variance was 2.139 for the Group A (control group) & 4.98 for the Group B (experimental group).

Section 4: To compare pre and post evaluation of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy.

Table 6: Comparison of pre & post assessment of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy, N = 100; $n_1 = 50$, $n_2 = 50$

Statistics	Pre test Knowledge		Post test Knowledge	
	Group A (control group)	Group B (experimental group)	Group A (control group)	Group B (experimental group)
Mean	2.18	1.20	2.06	2.54
Median	1.00	0.00	0.00	3.00
Std. Deviation	2.37	1.85	1.46	2.23

Table 6 shows that the mean score of Group B (experimental group) is less μ=1.20 in pretest which has increased to 2.54 this increase is found considerable which has determined the effectiveness of Self Instructional Module (SIM) on knowledge regarding Cord Blood Banking and Stem Cell Therapy among antenatal women.

Section 5: To determine the effectiveness of Self Instructional Module (SIM) on knowledge regarding Cord Blood Banking and Stem Cell Therapy among antenatal women.

As participants from Group A (control group) and Group B (experimental group) do not follow the normal distribution the Effectiveness of Self Instructional Module (SIM) as assessed by using the Mann-Whitney U test. This test is a non-parametric test used to test the null hypothesis. The table below represents U statistics of post-test knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy after the Self Instructional Module (SIM) in the Group B (experimental group) and Group A (control group).

Table 7: Mann-Whitney U test for evaluation of post-test knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy, N = 100; $n_1 = 50$, $n_2 = 50$

Groups	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Asymp. Sig. *p*
Group A (control group) ($n_1 = 50$)	50	41.32	2066	791	3.16	.00158*
Group B (experimental group) ($n_2 = 50$)	50	59.68	2984			

*considerable finding at 0.05 level of significance

Table 7 shows that Mann-Whitney U test was conducted to determine whether there was a change in the post knowledge scores of experimental and Group A (control group) and if so is that difference is statistically considerable. Above table depicts mean rank of Group B (experimental group) is 59.68 verses Group A (control group) 41.32. The rank average of the posttest scores of the Group B (experimental group) women 2984 while the women in the Group A (control group) had a posttest score rank average of 2006. The analyses had shown considerable difference between the rank averages of the groups' posttest knowledge scores; Calculated Mann-Whitney U= 791; $Z = P$ = .001< .05 indicated that Self Instructional Module (SIM) regarding Cord Blood Banking and Stem Cell Therapy had a considerable effectiveness on the knowledge level of Group B (experimental group). Hence, null hypothesis is rejected that, there is no considerable

change in the post test scores of knowledge of antenatal women regarding Cord Blood Banking and Stem Cell Therapy at 0.05 level of significance.

Section 6: To associate the pre interventional findings with selected demographic variables.

Table 8: Association between pre interventional findings with selected demographic variables, N = 100; $n_1 = 50$, $n_2 = 50$

Variables	Value	*P*
Age	25.522a	0.377
Education	65.368a	0.006**
Number of children	30.987a	0.154
Occupation	29.983a	0.185
Religion	11.135a	0.988

**Pre-interventional finding are associated with educational level of participants

The results presented in Table 8 indicates that there is no statistically considerable association between the pretest knowledge score with selected demographic variables; such as age the probability of the chi-square test statistic (chi-square=25.522) p=0.377, more than the alpha level of significance of 0.05 ; education (chi-square=65.368) p=0.006 which is < than the alpha level of significance of 0.05 hence concluded as the pre interventional findings of pretest scores and educational level of participants are associated with each other. In other terms we reject the null hypothesis and accepts the H_3 ; number of children (chi-square=30.987[a]) *p*=0.154 ;and occupation (chi-square=29.983) was *p* = 0.185; religion (chi-square=11.135[a]) *p*=0.988. Hence, except educational level of women participants of this study the Chi square findings accept the null hypothesis that there is no considerable association between the pre interventional findings related to pretest knowledge scores with selected demographic variable at 0.05 level of significance.

Conclusion

Test results of the statistical test shows that the Self Instructional Module (SIM) on Cord Blood Banking & Stem Cell Therapy was found to be effective in improving knowledge of the antenatal women. Knowledge scores were found to be associated with the level of education of the antenatal women.

Limitations

- As the study was conducted at 2 hospitals in Pune city, the scope of generalization limits.
- Self-prepared tools were administered which limits the standardization.
- There was no scope for getting antenatal women's opinion regarding Self Instructional Module (SIM)

Recommendations

- A similar study may be done on a larger sample.
- An identical study can be done in rural setting.
- An identical study can be conducted in other hospitals.
- An identical study can be done in community settings.
- An identical study can be carried out on the other populations like doctors, parents, staff nurses, lab technicians, etc
- A similar study can be conducted using knowledge booklet, awareness Programme, planned teaching programme or video assisted teaching etc

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